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WEEKLY

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No. 1

July 6, 1918

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The Monotony of Unusual Performance



11th YEAR

TO DUPLEX 4-Wheel Drive Trucks, the unusual is the commonplace! Breaking records has become a matter of course.

To us, Duplex performance is nothing to wonder at; it is expected—planned, and predetermined. This is why we rarely cite definite cases of Duplex achievement, such as the following:

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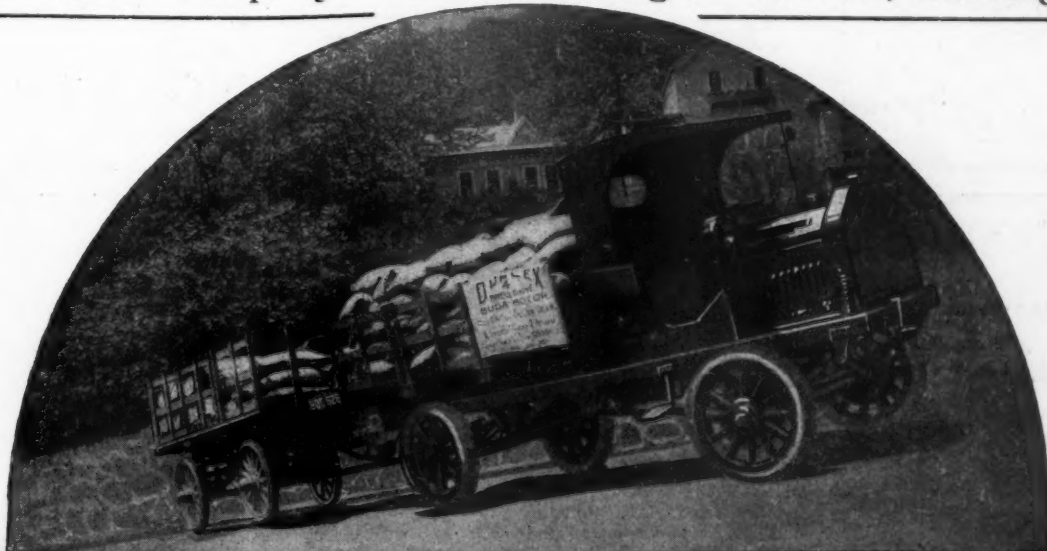
"Seven miles to the gallon with four tons on truck, and pulling a trailer carrying three tons is indeed a marvelous performance."

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"In all my records which cover the operation of 1,400 different trucks I can find nothing to compare with it."

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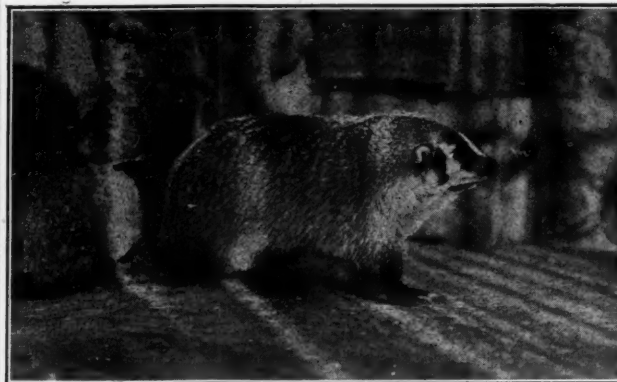
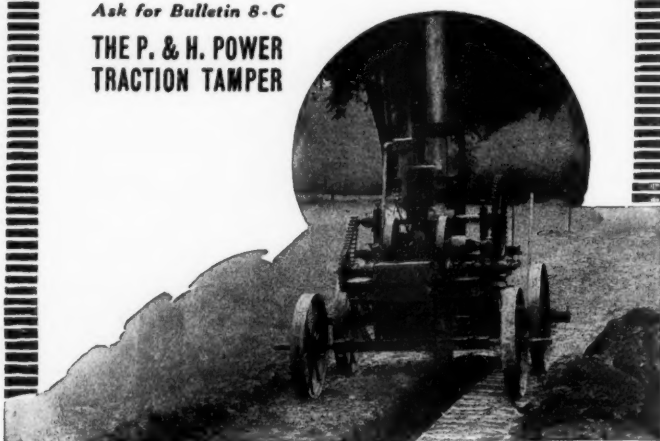
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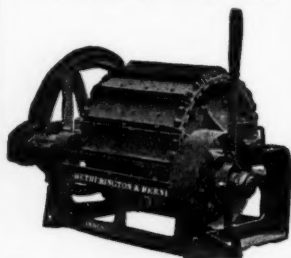
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NEW YORK, JULY 6, 1918

No. 1

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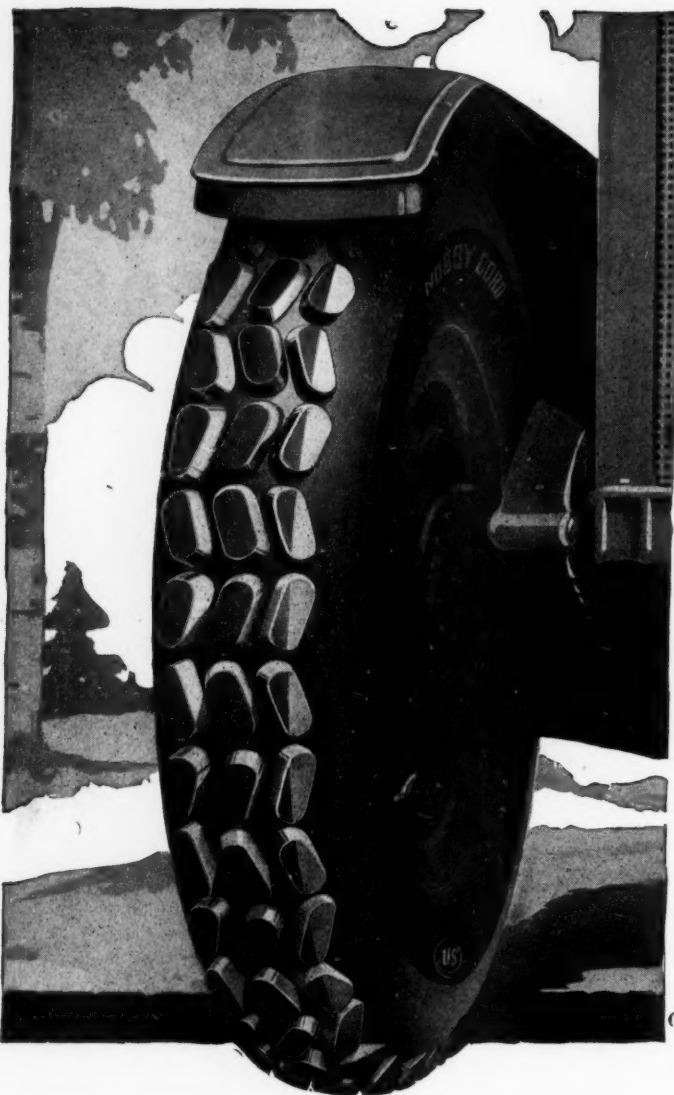
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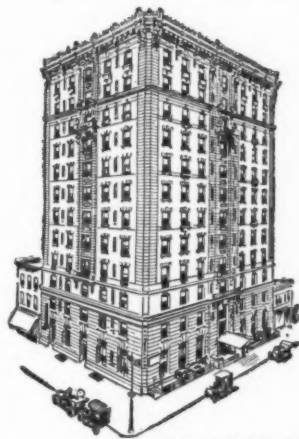
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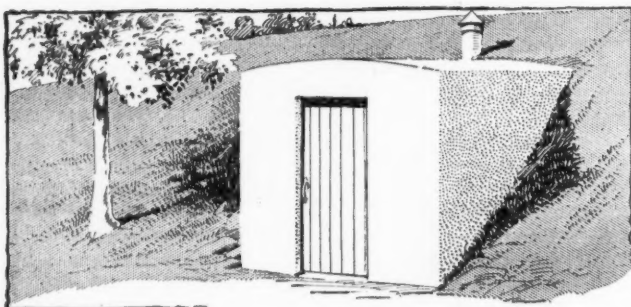
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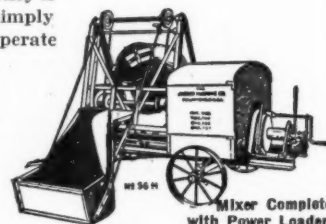
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Volume XLV.

NEW YORK, JULY 6, 1918

NO. 1

THE LOS ANGELES NEW OUTFALL SEWER

Conduit of Plain and Reinforced Concrete, Cast Iron Pipe and Wood-Stave Pipe, the Last Carried on a Pier Extending Nearly Two Thousand Feet into the Pacific—Proposed Treatment Plant

The city of Los Angeles, California, until recently had discharged its sewage into the Pacific ocean through an outfall sewer, which outfall terminated in a 34-inch wood-stave pipe that extended 970 feet from shore, being supported on a pier. The old outfall sewer was found to be deteriorating; also it was too small in size and did not discharge sufficiently far from land. There are no perceptible currents in the ocean at Hyperion, where the outfall discharges, and the diffusion of the sewage in the water of the ocean is often so slow that sewage material is continually visible on the surface over a considerable area. There is also more or less odor in the vicinity, and neighboring beach cities complained of the pollution of the water and of the air.

To remedy these conditions, a new outfall has recently been built which extends about twice as far into the ocean, is provided with multiple outlets, and is of larger size; and plans have been prepared for treating the sewage before being discharged into the ocean. The new outfall sewer, known as the Bellevue Avenue outfall, intercepts the sewage on the easterly slopes of the sand hills that lie between the ocean and the country in the rear, passes in tunnel through these hills (so called, although the extreme height at the point of tunneling is only about 100 feet), and is continued as a 52-inch wood-stave pipe supported on a pier for a distance of 1,955 feet. The entire length of the outfall is 6,248 feet, of which 3,728 feet has a diameter of 5 feet 9 inches, 1,955 is 52-inch wooden conduit, 84 feet is 42-inch cast iron pipe, and the balance is 4-foot 4-inch conduit. The iron pipe, 4-foot 4-inch conduit and wood-stave section are all under some head and are therefore made somewhat smaller than the gravity conduit.

The gravity conduit has a grade of 0.30 per cent. At the end of this comes the 42-inch cast iron pipe, inclined at an angle of 23° 45', giving a sudden drop which places the rest of the conduit under pressure. The

pressure conduit is nearly level, there being a drop of only one foot in the 1,955 feet of wood-stave pipe.

The 5-foot 9-inch conduit consists in the lower half of 1: 3: 6 concrete, 8 feet 6 inches wide on the bottom, a batter of 1 in 12 on the outer faces, and 9 inches thick at the springing line, on top of which is built a circular arch of two rings of brick, the whole being lined with an inner ring of brick, thus making the arch really a three-ring construction. The brick invert was coated with plaster one-half inch thick.

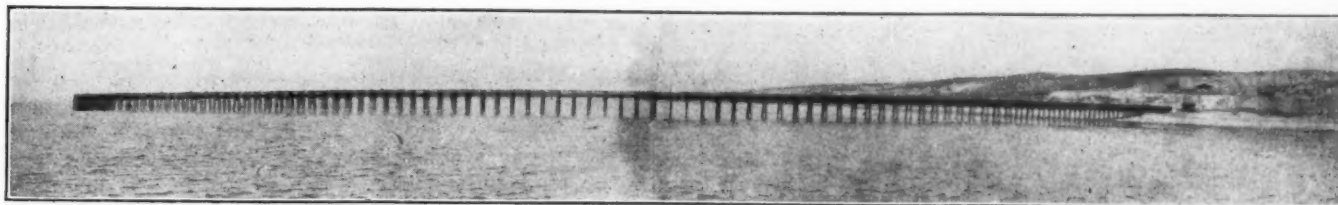
The smaller sized conduit, being under some pressure, is of concrete reinforced with $\frac{1}{2}$ -inch square twisted rods spaced $4\frac{3}{4}$ inches between centers surrounding the sewer and 2 inches from the face, and $\frac{3}{8}$ -inch square twisted rods 16 feet long lapping 22½ inches, tying the ring reinforcing bars together. The interior of the conduit consists of one ring of vitrified brick, surrounded with concrete mixed 1:2:4, 6-inches thick at the invert, 8½ inches at the springing line and 6 inches at the crown.

The capacity of the 5-foot 9-inch conduit when running full is calculated to be 166 cubic feet per second. At the present time the sewage flow averages about 50 cubic feet per second.

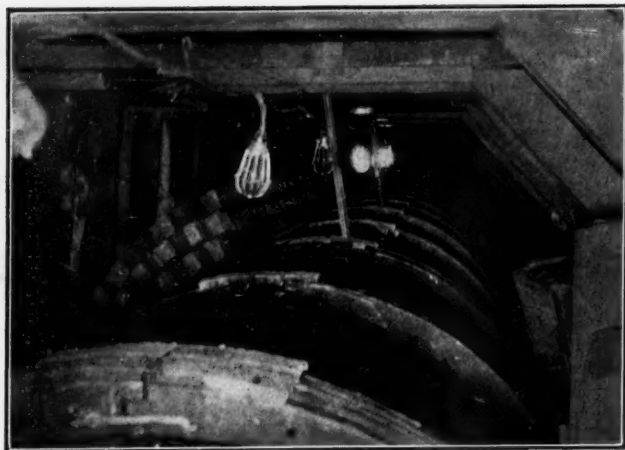
The average depth of the larger conduit, except at the east portal and at a point near the center of the tunnel, is about 100 feet below the top of the sand hills, which necessitated building it in tunnel. Work was started at the west portal, but later was conducted simultaneously from both ends. The entire excavation was through loose sand. The average progress was nine feet per heading per day.

The total cost of the tunnel work was \$63,950, an average of \$14.90 per linear foot. Excavation cost \$2.70 per cubic yard, of which \$1.47 was for labor, teams and foreman, and \$1.01 for timber and lumber. Excavation in open cuts cost \$.50 per cubic yard. Labor cost from \$2.50 to \$3 per day and teams \$5 per day. The cost of the equipment for the tunnel work and preparatory work incidental thereto amounted to \$13,650.

* Abstract of report by W. T. Knowlton, Sewerage Engineer of Los Angeles.



PIER CARRYING SEWER OUTFALL INTO PACIFIC OCEAN.



LAYING BRICK ARCH IN TUNNEL UNDER SAND HILL.

On the completion of the tunnel work, the construction of the conduit lining to the tunnel was begun. This cost \$15.81 per foot of conduit. The brick invert cost \$23.75 per thousand brick, of which \$13.04 was for material; the concrete surrounding the brick invert cost \$7.42 per cubic yard. The brick work in the arch cost \$32.37 per thousand bricks. The half-inch coating of plaster on the invert cost 39 cents per linear foot or about 4 cents per square foot. On this work labor cost from \$2.75 to \$3.50, carpenters, blacksmiths and electricians received \$4 per day, and masons \$6. The cement cost from \$1.52 to \$1.89 per barrel f.o.b. factory, rock and sand averaged 80 cents per ton f.o.b. Hyperion, and the brick cost \$8.40 per thousand at Hyperion.

The cost of the brick ring in the smaller reinforced section was \$68.19 per thousand bricks in place, the material alone costing \$34.91, of which about \$30 was for special vitrified brick used.

The 52-inch wood stave pipe is supported by a pier on a practically level grade, there being but one foot fall in the entire length of 1,955 feet. The pier cost \$55,718, or \$28.50 per linear foot, of which \$12.05 was for piling and \$7.33 for labor. The piles at the outer end of the pier reached a length of 75 feet. The wood-stave pipe cost \$9.75 per linear foot, the staves costing \$65 per thousand foot board measure. The outlets from the wood-stave pipe consist of vertical sections of steel pipe 2 feet in diameter and 27 feet long, of $\frac{1}{4}$ -inch steel, connected to the bottom of the wood-stave pipe by a steel flange held in position against the outside of the pipe by a band of $\frac{1}{4}$ -inch steel that entirely surrounds the pipe. The wooden pipe is supported on wooden saddles spaced at 5-foot intervals, which in turn are supported by stirrup rods suspended from cross-ties that rest upon 10-inch by 16-inch longitudinal girders.

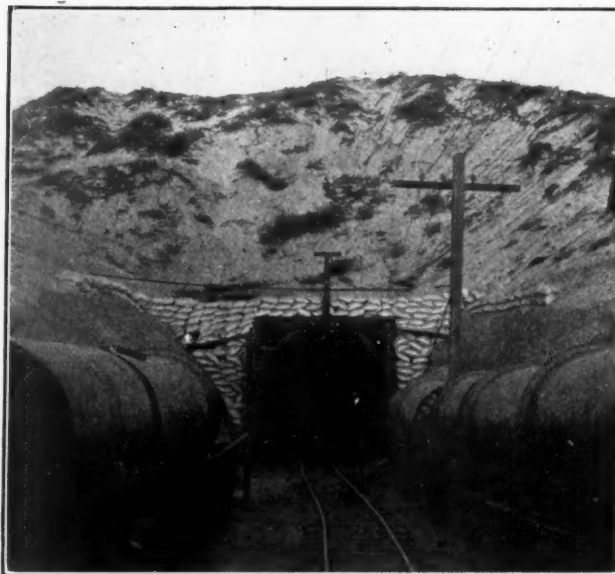
The total cost of the outfall was \$226,064. Work was begun on September 10, 1916, and was completed in March, 1918. After two months of use it is found that the conditions at the outlet have been improved somewhat, but the necessity of treating the sewage before discharging it into the ocean still remains.

The water averages about 30 feet deep at the end of the pier and sewage is discharged into this through five outlets extending 18 feet below mean tide level. Plans have been prepared for a series of two-story sedimentation tanks, with sludge beds on the ocean side of the sand hills, covering approximately 20 acres. It will be necessary to excavate about 1,700,000 cubic yards of sand to level off the area for this proposed plant. The plans call for 32 double sedimentation tanks and an equal number of sludge beds, the latter being 100 feet long by 40 feet wide.

WATER WORKS OPERATION.

Consumption per Capita and per Consumer—Domestic, Industrial, Commercial and Public Consumption—Estimating Leakage and Waste.

Decision as to whether or not the amount of average daily consumption by a given community indicates excessive leakage and waste cannot be made by the simple process of dividing total consumption by total population and comparing the quotient with a standard figure of per capita consumption. There are several reasons for this. In the first place, the consumers may not only be domes-



WEST PORTAL OF TUNNEL

Shows type of timbering, nature of sand hill, and bags to prevent sand slides. Pipes for c. i. section of sewer temporarily stored in cut.

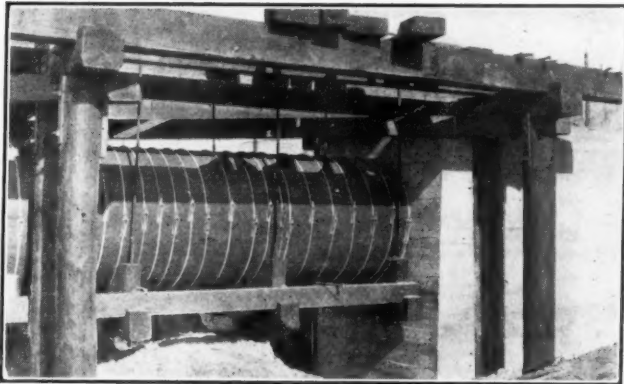
tic but may also include industrial plants or railroads that use large amounts legitimately, thus increasing the per capita consumption. Or, on the other hand, the actual consumers may be a small percentage of the total population, and the per capita consumption (consumption divided by total population) may be low, while that per actual consumer may be high. The leakage from mains also should be considered in relation to the miles of mains and not to the number of either consumers or total population. Also the consumption during spring or fall may be moderate, but that during winter or summer excessive.

In general, then, a permissible leakage from the mains and services should be decided on and deducted from the total consumption. The use by industrial plants and railroads or other non-domestic consumers should be determined and this also deducted. The difference is then divided by the number of domestic consumers to determine the consumption per domestic consumer. Also the use by non-domestic consumers should be looked into to determine whether it is excessive.

What is permissible leakage is a mooted question. The amount, with a given quality of joint, varies with the circumference of joint, the number of joints, and the pressure. It is claimed that with the best of workmanship it can be kept below 100 gallons per day per inch-mile of pipe. (Inch-mile is the product of the diameter of the pipe and its length in miles.) Actual measurements, however, have given figures largely in excess of this. Most of the published figures range from 200 to 10,000 gallons per inch-mile. Gregory, in reporting on improvements for the Columbus, O., water supply,

named 500 to 530 as allowable. Perhaps the most exact statement for general use that can be made is that, if the leakage in an existing system does not exceed 500 gallons per inch-mile, no action for reducing it is worth while; but if it exceeds 10,000 gallons, effort should be made to reduce it. Between these limits the amount of money that can economically be spent in locating and stopping leaks depends upon the cost of supplying the lost water, or the expenditure for extensions that can be avoided by reducing the leakage, and the detriment that it causes to the service by reducing pressure or fire-fighting effectiveness.

The use by industrial plants can generally be determined only by actual measurement. Probably the majority of cities meter all or most services supplying such plants, since the amount wasted by one of them is likely to be much greater than that wasted by any single residence. If there is not a meter on the service and it is not wished to install one, the amount can sometimes be determined approximately by closing all valves on the mains supplying it, connecting a hydrant inside the cut-out area with one outside by means of a line of fire hose containing a 4-inch meter, through which must pass all the water used in the cut-out area. Allowance must then be made for domestic consumers in this area. A more accurate determination can be made by using a pitometer in the service, if it is a large one, or in the main near the service.



JUNCTION OF WOOD STAVE PIPE WITH MASONRY SEWER.

In the case of some small cities, railroad use for filling locomotive tanks sometimes amounts to more than half of the total consumption. In any case the amount used is apt to be very considerable. (Each locomotive uses from 2,000 to 5,000 gallons of water per 100 miles run.) Some cities have permitted the railroad to draw water directly from the main to the locomotive through a 6-inch pipe or larger, which would make a meter very expensive; but this is decidedly inadvisable, because of the water hammer caused by the rapid closing of the valve on the water crane. The water should be fed into a tank through a smaller pipe. A meter can be placed on this; or occasional counts made of the number of locomotives per day supplied with water and measurements of the amount drawn for each. The use by railroads in washing cars, wetting down cinders and other uses about yards and depots is often very considerable.

If the use by mills, railroads and other non-domestic users is metered and paid for on the quantity basis, no further effort is necessary to limit it in most cases. It may be, however, that it is a question of either reducing consumption or spending a large amount in increasing the supply, when it is desirable to take up with the company the question whether it cannot reduce its consumption as an alternative to cutting it off altogether. In

working out this solution, however, the effect on the community of driving away the industry by cutting off its water supply should be considered.

The determination of the number of consumers should be a simple matter—in fact, the records of the department or company should already contain an approximation to it. But the writer has found more than one company that could not tell, without a tedious overhauling of its records, how many domestic service connections it was supplying. There are few cities that number all their residents among the water consumers; on the other hand, a number of plants supply a considerable number of consumers living outside the city limits. The tables in Municipal Journal for May 3, 1917, give consumption statistics for several hundred cities in which these points are brought out. For example, Santa Rosa, Cal., reported 11,000 population and 2,423 consumers. On the other hand, Columbus, Ga., reported 25,000 population and 40,000 consumers. The per capita consumption in the former was calculated to be 65 gallons—a fairly reasonable figure, but that per consumer was in reality 300 gallons, which indicates excessive waste. While the per capita consumption of Columbus figures out 93 gallons, which is high, but that per consumer averaged 58 gallons.

A part of the non-domestic consumption in almost every city is the commercial, or that used in stores and offices, and that used in hotels by transients. This is generally between 7 and 20 per cent of the total consumption, although fixtures that leak or are left constantly running in hotels sometimes cause a waste that brings it above this. Commercial consumption in a number of cities where all of it is metered averaged 10.5 gallons per capita in 1914, being 1.7 gallons in Oak Park, Ill., 6.5 in Madison, Wis., 7.2 in Corning, N. Y., and Elyria, O., 7.5 in Pine Bluff, Ark., and 32.0 in Milwaukee, Wis. Rochester, N. Y., is perhaps an average city as regards consumption, and here the domestic consumption was 31.2 gallons per capita, the commercial was 12.2, and the industrial 18.3. There was also a public consumption of 4.8 gallons per capita. The averages for fourteen metered cities were: Domestic, 29.7; commercial, 10.5; industrial,



REINFORCED CONCRETE SEWER AND OUTFALL PIER.

ANALYSIS AND QUALITY OF WATER—PUBLIC USE OF GROUNDS

Reports from Several Hundred Water Works Superintendents Relative to Their Plants—Last of Four Tables Compiled from Data Furnished This Year Especially for This Purpose.

City and state.	Municipal or private plant	Are regular periodic analyses of water made?	By whom are analyses made?	How often are analyses made?	Is quality of water satisfactory in all respects?	To what extent are grounds around reservoirs and pumping stations used by the public?
Alabama:						
Gadsden	Municipal	Yes	State laboratory	Monthly	Yes	None
Talladega	Municipal	Yes	State laboratory	Quarterly	Hard	None
Arizona:						
Nogales	Municipal	Yes	U. S. Government	Semi-annually	Yes	None
Arkansas:						
El Dorado	Private	Yes	Arkansas Water Co.	Every two months	Yes	None
California:						
Anaheim	Municipal	No	State chemist daily	Not since 1917	Hard	A few picnics on water sheds
Eureka	Municipal	Yes	City chemist	ing monthly	Yes	None
Glendale	Municipal	Yes	State Board of Health	Annually	Yes	None
Oxnard	Municipal	Occasionally	State Board of Health	Semi-annually	Yes	None
Pacific Grove	Private	Yes	Chemists and Bd. of Health Company	Twice in five years	Yes	Some used for camping, fishing and hunting—National Forest Reservation
Redlands	Municipal	Yes	.....	Weekly	Yes	Pumping station as park
Santa Maria	Municipal	Yes	.....	.....	Yes	No room
Santa Rosa	Municipal	Yes	State University of California	Annually	Hard	None
Stockton	Private	Not regularly	Various chemists	Once a year	Yes	None
Colorado:						
Colorado Springs ..	Municipal	Yes	City chemist	Six days a week	Yes	None permitted
Ft. Morgan	Municipal	No	Gt. Western Sugar Co.	Once a year	Yes	None
Greely	Municipal	Yes	Health officer	Weekly	Yes	None
Longmont	Municipal	No	State chemist	When thought necessary	Practically so	Very little
Connecticut:						
Ansonia	Private	Yes	State Board of Health	Monthly	Yes	Not permitted
Bristol	Municipal	Yes	Private chemists	Weekly	Yes	Not permitted
E. Hartford	Municipal	Yes	State Board of Health	Semi-annually	None better	Not permitted
Middletown	Municipal	Yes	State Board of Health	Monthly	Yes	None
New Britain	Municipal	Yes	Private chemists	Weekly, monthly and semi-annually	None better	Only passing through
Florida:						
New London	Municipal	Yes	State laboratory	.....	Yes	None
So. Manchester	Private	Occasionally	State	.....	No serious complaints	None
Southington	Municipal	Yes	State laboratory	Monthly	Generally very satisfactory	None
Suffield	Private	Yes	State	Annually	Yes	None
Wallingford	Municipal	Yes	B. Coli by Supt. weekly	Monthly by private laboratory	Yes	None
Williamantic	Municipal	Yes	State Board of Health	2 or 3-month intervals	Yes	.....
Windsor Fire Dist.	Municipal	Yes	State Board of Health	Monthly	Yes	None
Georgia:						
Daytona	Municipal	For softening process	Superintendent	Irregularly	Very	None
De Land	Municipal	Yes	State Board of Health	4-month intervals	Yes	Not much
Ft. Myers	Municipal	No	State Board of Health	Semi-annually	Except hardness	.....
Orlando	Private	Yes	State Board of Health	Once a month	Yes	None
St. Augustine	Municipal	Yes	State Board of Health	Always reported pure	Always reported pure	None
Idaho:						
Amertus	Municipal	Yes	State Board of Health	Semi-annually	Yes	None
Atlanta	Municipal	Yes	City chemist at filter	Daily	Yes	Very much
Commerce	Municipal	Yes	Superintendent	Daily	Yes	None
La Grange	Municipal	Yes	City engineer	Weekly	Yes	None
Milledgeville	Private	Yes	Engineer	Daily	Yes	None
Thomasville	Municipal	Yes	State Board of Health	Semi-annually	Yes	None
Tifton	Municipal	Yes	State chemist	Semi-annually	Yes	None
Waynesboro	Municipal	Yes	State	Twice a year	Yes	.....
Illinois:						
Boise	Private	Yes	State chemist	Monthly	Yes	None
Lewistown	Municipal	Yes	Idaho University	Monthly	Yes	Entire plant as city park
Sandpoint	Private	No	Spokane city chemist	.....	Yes	None
Twin Falls	Municipal	Yes	State chemist	Monthly	Yes	None
Weiser	Municipal	Yes	State Medical Bd.	Monthly during summer	Yes	Park at pumping station
Indiana:						
Bloomington	Municipal	Yes	State water survey	Quarterly	Yes, sanitarily; produces scale	As picnic grounds
Champaign and Urbana	Private	Yes	State water survey	Monthly or oftener	Crenothrix at times	.....

City and state.	Municipal or private plant	Are regular analyses of water made?	By whom are analyses made?	How often are analyses made?	Is quality of water satisfactory in all respects?	To what extent are grounds around reservoirs and pumping stations used by the public?
Downers Grove ..	Municipal	Yes	State water survey	Bi-annually	Yes, except hard	Park around standpipe; dept. grounds parked to limited extent
Flora	Municipal	Yes	State water survey	Annually	Yes	None
Freeport	Private	Yes	Superintendent	Daily	Yes	The fullest possible
Lake Forest	Private	Yes	State water survey	Annually	Yes	For picnics
Marshall	Municipal	Yes	State water survey	Annually	Yes	Practically none
Mattoon	Municipal	Yes	State water survey	Annually	Yes	Ground at reservoir used as park
Mendota	Private	Yes	State water survey	Every two weeks	Yes	.....
Mt. Vernon	Private	Yes	State water survey	Semi-annually	Yes	None
Paris	Municipal	.....	Hygienic Institution	Monthly	Used commercially only	.....
Peru	Municipal	Yes	Superintendent	Daily	Yes	None
Quincy	Municipal	Yes	City chemist daily	State monthly	Yes	None
Rock Island	Municipal	Yes	.....	.....	Yes	None
Watseka	Municipal	No	.....	.....	.....	.....
Indiana:						
Bedford	Municipal	Irregularly	State chemist	2 or 3-month intervals	Yes	None
Bluffton	Municipal	Yes	State chemist	1 or 2-month intervals	Yes	None
Brookville	Municipal	No	State Board of Health	Quarterly or oftener	Yes	None
Delphi	Municipal	Yes	City health officer	Monthly	Always	None
Elwood	Private	Yes	State chemist	Several times a year	No	None
Ft. Wayne	Municipal	Yes	State chemist	.....	.....	Skating and parks at reservoir and 2 pumping stations
Goshen	Municipal	Yes	State chemist	Annually	Yes	None
Knightstown	Municipal	Yes	State Board of Health	3-month intervals	Yes	None
La Porte	Municipal	Yes	State Board of Health	Quarterly	Yes, for potable use	None
Lebanon	Municipal	Yes	State Board of Health	Bi-weekly	Yes	None
Linton	Municipal	.....	State Board of Health	Occasionally	Yes	None
Mishawaka	Private	.....	South Bend laboratory	Bi-monthly	Yes	None
No. Manchester	Municipal	.....	State chemist	About once a year	Yes	None
Peru	Municipal	.....	Board of Health	Semi-annually	Yes	None
Plymouth	Municipal	Yes	State Lab. of Hygiene	Annually	Very good	None
Terre Haute	Private	Yes	Company's bacteriologist	Daily	Yes, sanitary standpoint	Tennis court and picnic grounds
Tipton	Municipal	Yes	State Board of Health	Semi-annually	Yes	None
Union City	Municipal	Yes	Private chemist	Semi-annually	Yes	.....
Vincennes	Private	Yes	Private chemist	Once or twice a week	Yes	None
Iowa:						
Boone	Municipal	Yes	State University	Monthly	Yes	None
Burlington	Private	Yes	State University	Twice a week	Yes	None
Cedar Falls	Municipal	Yes	State Board of Health	Monthly	Yes	None
Cedar Rapids	Municipal	Yes	Regularly employed chemist	Daily	Too hard	Country club, skating
Creston	Private	Yes	State University	Monthly	Yes	None
Fairfield	Municipal	Yes	State University	Monthly, April 1 to Oct. 31	Yes	None
Hawarden	Municipal	Yes	State chemist	Annually	Yes	Grounds at pumping station used as athletic park
Maquoketa	Municipal	Yes	State College	2 or 3 times a year	Yes	Tennis courts on W. W. grounds
Mason City	Municipal	Yes	State Board of Health	Semi-annually	Yes	.....
Sioux City	Municipal	Yes	State chemist	Monthly	Yes	None
Spencer	Municipal	Yes	State chemist	Bi-annually	Yes	None
Stanton	Municipal	No	.....	.....	Yes	None
Vinton	Municipal	Yes	State chemist	1 to 3 times a year	Yes	None
Washington	Municipal	Yes	State University	Annually	Yes	None
Winterset	Municipal	Yes	State University	Semi-annually	Yes	None
Kansas:						
Chanute	Municipal	Yes	State Board of Health	Weekly	Yes	None
Coffeyville	Municipal	Yes	State Board of Health	Weekly	Yes	None
Council Grove	Private	Yes	State Board of Health	Weekly	Yes	Very little
Emporia	Municipal	Yes	State Board of Health	Weekly	Yes, except hard in dry seasons	For picnics
Fort Scott	Municipal	Yes	State Board of Health	Weekly	Most cases	Parks at reservoir
Fredonia	Municipal	Yes	State Board of Health	Weekly	Yes	Very little
Great Bend	Private	Yes	K. C. Testing Laboratory	Quarterly	Yes, bacteriologically	None
Hiawatha	Municipal	Yes	State Water & Sewerage Sur.	Quarterly	Yes	One acre at water tower
Horton	Municipal	Yes	State Board of Health	Weekly	Yes	Occasional picnics
Independence	Municipal	Yes	State Board of Health	Weekly	Yes, bacterially; refinery waste causes some trouble	Tennis, club house, shelter houses
Larned	Municipal	Yes	State University	Quarterly	Yes	None
Manhattan	Municipal	Yes	State Board of Health	Quarterly	Too much iron	None
McPherson	Municipal	Yes	State University	Annually	Yes	None
Neodesha	Municipal	Yes	State Board of Health	Weekly	Yes	None
Newton	Municipal	Yes	State Board of Health	Several times a year	Yes	None
Olathe	Municipal	Yes	State Board of Health	Weekly	Yes	Fishing and skating
Osage City	Municipal	Yes	State Bd. of Health and supt.	Weekly	Fair	None
Osawatomie	Municipal	Yes	State Board of Health	2 or 3 times a year	Yes	Picnics and outing tents
Topeka	Municipal	Irregular	State Board of Health	Weekly	99.98% pure and soft	None—14 miles from town
Wellington	Municipal	Yes	State University	Quarterly	.....	.....

a—Bacterial count and test for B. Coll in 1 and 10 c. c.;

29.4, and public, 4.5. The above figures are for cities that are completely metered or practically so. In unmetered cities the consumption of each class is likely to be greater, but such excess may be assumed to be waste until proved to be otherwise.

The public consumption is that used in schools and other public buildings, in flushing streets and sewers, in fountains and parks, etc. In many cities the public consumption includes a larger percentage of waste than any other class of use, especially in the schools. Instances have been reported where consumption in schools has been reduced 75 to 90 per cent when the janitors and teachers were forced to stop waste.

If a city is wholly metered and the meters are fairly accurate, the estimate of leakage underground is simple and reliable. To the extent that it is not metered will the estimate of leakage and waste be more or less approximate. But by use of the above figures or other reliable ones and the methods outlined, it can generally be judged whether or not there is excessive leakage or waste. Which it is, whether leakage or waste, can generally be learned only by a more detailed study of the facts.

The above is based on 24-hour consumption. It is extremely useful to know also the night consumption, between 2 and 5 a. m., when legitimate domestic and commercial consumption is practically nothing and the industrial consumption, if there is any, can generally be learned by a visit to the several plants or by the meters at such plants. Allowing for such known uses, all other water passing through the mains during the hours named may be assumed to be leakage through mains and services and plumbing fixtures. Such leakage, however, will be constant, and if the consumption fluctuates during those hours it indicates that fixtures of some kind are being opened and closed. Where a continuous record by 10-minute or shorter intervals is kept, the minimum reached, less known continuous use by industrial plants, is generally taken to represent the amount of leakage. This will probably be increased during the daytime by more or less deliberate waste; but the latter cannot be remedied by any mechanical changes—metering is the only means of reducing it. The minimum night consumption figure therefore give a fair indication of the amount of loss that can be eliminated by locating and repairing all leaks; but not necessarily of the total preventable loss by both leakage and waste.

SANITARY DRINKING FOUNTAINS.

A committee on sanitary drinking fountains of the Iowa section of the American Water Works Association made a report before the annual meeting of the section in which it reviewed an investigation of such fountains from which it had drawn the following conclusions:

"First, all drinking fountains should have suitable mouth guards. Second, sanitary fountains of the intermittent-flow type with the vertical jet are unqualifiedly condemned. Third, sanitary drinking fountains of the continuous type, with a vertical jet, even when properly designed, would seem to be possible factors in the spread of contagious disease, if the Wisconsin laboratory experiments are confirmed

by further tests. Fourth, the slanting-jet type of fountain with the nozzle properly protected is perfectly safe, simple in design, and inexpensive to purchase. A design is already on the market which may be attached to any of the present types of drinking fountains. Fifth, your committee asks to be continued in order that it may make further investigations, particularly with reference to continuous-flow bubblers of the vertical type."

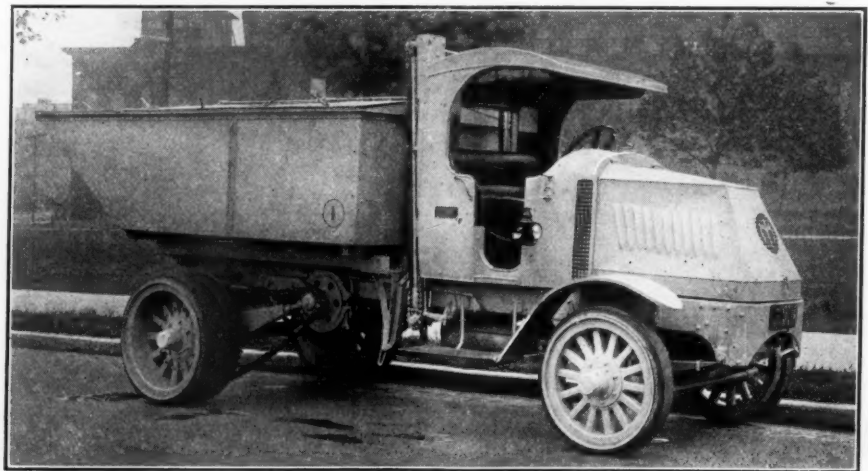
The committee reported that most of the fountains now available seem to have been designed with reference to appearance rather than to the laws of sanitary science. Some of the fundamental principles which most of them violate are:

First, that the fountain should be so designed that the lips of the drinker may not touch the metal top of the bubbler. Second, that no fountain should be so designed that the incoming bubble of water passes through a cup of contaminated water which cannot drain out. Third, that in the case of bubble fountains without mouth guards, the height of the bubble should always be sufficient to permit easy drinking without resting the lips directly upon the metal top of the bubbler. (This is usually the fault of the owner and not of the manufacturer.) Fourth, fountains should be so designed that the water which has touched the lips of the drinker cannot be retained by the fountain long enough to endanger the next drinker.

The committee has not yet satisfactorily answered the question whether a properly designed continuous flow vertical jet fountain is dangerous, and if it is, why. Experiments upon such a fountain made at the University of Wisconsin seemed to show real danger. Bacteria from the mouths of persons who drank from a bubble two or three cm. high appeared to remain in the bubble sometimes as long as two hours, but no satisfactory explanation of this has been advanced. One theory was that the organisms danced upon the column of water much as a ball dances upon the top of a garden fountain. The committee consists of J. H. Dunlap, chairman; Henry Albert and Jack J. Hinman, Jr.

REFUSE DISPOSAL AT THE CANTONMENTS.

The problem of disposing of the garbage and other refuse at the several cantonments has been solved in a way that would seem to leave little to be desired, whether the point of view be sanitation, economy, or conservation of the valuable matters in the waste materials.



TRUCK USED BY ONE OF THE CONTRACTORS FOR REMOVING GARBAGE FROM CANTONMENT.

Mack "Sanitary Garbage Truck." Steel tops fastened on by hand nuts, making water-tight joint.

Consideration was at first given to the idea of incinerating all the material, even including the manure; but this was not adopted, and instead arrangements have been made for the sale of the materials, thus saving to the Government the cost of constructing and operating incinerators and besides yielding a considerable revenue. The prices received are higher than they would be in the case of a city, because of a more complete separation of the materials, which is made possible by military control. At each kitchen all waste material is sorted and placed in separate cans, so that garbage, bones, fats, paper, tin cans and bottles, each can be delivered separate from the others. The materials are sold in most cases on the basis of the monthly number of occupants of the cantonments, and manure at so much per animal per month. The materials are generally sold to local contractors, who pay prices ranging from 3 cents to 9 cents per man per month and averaging 5 cents, this including all wastes except manure.

At a few camps the basis of sale is different; at San Antonio, for instance, bones bring \$11, garbage \$1.90 and waste paper \$4 per ton, while at Camp Devens the contractor pays \$2,160 a month for all camp wastes. These include the removal of the materials from the camp, but not their collection.

The garbage is placed in cans in the kitchen, and the can removed and a clean one left in its place. The cans, which are provided with close-fitting covers, are taken by Government trucks to a transfer station under the supervision of sanitary inspectors, where the garbage is dumped into trucks of the contractor. The transfer stations consist of platforms and storage sheds, the collecting trucks unloading on one side of the platform and the contractor's trucks drawing up on the opposite side. Here there are hot water facilities and the cans, after being emptied, are cleaned and sterilized before being returned to the kitchens. The contractors are required to remove the materials at least three miles from the cantonment reservation for whatever disposal they may make of them.

Manure was more difficult to dispose of than the other wastes. There is an average of 12,000 animals at each cantonment, from which it is estimated that at least 120 tons of manure per day per camp will accumulate. It would cost 60 cents per tons to haul and incinerate this, whereas by selling it the Government secures a net return of more than \$200,000, besides saving the cost of incineration.

It is estimated that it would have cost \$700,000 to erect incinerators with capacity to dispose of all waste materials and 60 cents per ton for fuel alone for burning them; and that there would be 40 tons per day of wastes other than manure at each cantonment. This would have made the cost of incineration of materials other than manure about \$122,275 per year. Altogether the returns to the Government from selling wastes plus the saving of cost of incineration will net the Government nearly two million dollars a year. In addition there is the satisfaction of knowing that the valuable products in such wastes are recovered.

CEMENT JOINTS FOR WATER MAINS.

In Redlands, Cal., the joints of all cast-iron water mains are made of cement instead of lead. City engineer Geo. S. Hinckley informs us that such joints have given perfect satisfaction, and are much more economical to make than lead ones, as the pipe can be laid much more rapidly and with less labor than when lead is used, besides the cost of the cement being much less than that of lead.

RAPID CURB CONSTRUCTION.

Continuous Deposit of Concrete Direct from Mixer Into Forms—Mixer Travels an Average of One Hundred Feet an Hour.

In preparing for repaving about two miles of Park Street, one of the main thoroughfares of Montclair, New Jersey, the Standard Bitulithic Company of Newark, New Jersey, is constructing a concrete curb along both sides of the street in advance of the other work, and is using methods that facilitate rapid construction.

The curb is 6 inches wide on the top, 12 inches wide on the bottom and 24 inches deep. The forms used consist of 2-inch plank (1-inch boards are used on curves) held in place by wooden stakes and braces against the sides of the trench excavated for the curb. Three 8-inch planks, generally in 12-foot lengths, are fastened together by cleats so as to form a complete form 24 inches wide for the front or back of the curb, and can be placed and removed more rapidly and readily than if the planks were separate. The forms for the front and the back of the curb are kept at the right distance apart by steel plates which also serve to form the joints between the successive sections of the curb. These sections are made 8 feet long on tangents. To hold the front and back forms together and prevent their spreading under the pressure of the concrete, clamps are driven over the top of the form at frequent intervals, these consisting of $\frac{3}{4}$ -inch square steel bent to the approximate form of a U with square angles.

Before setting the forms, stakes are set at intervals in pairs, one at a sufficient distance in front of the curb and its mate at sufficient distance behind the curb to permit the excavation of the curb trench without disturbing the stakes. A horizontal board nailed to these two stakes gives the grade of the curb, while a mark on its lower edge gives the line of the front angle of the same. On curves, these grade and line boards are placed at 5-foot intervals, but on tangents the distances are made greater. Castings for inlets are set in place before the construction of the curb is begun. At intervals of about fifty feet, 6-inch round openings are left through the curb to provide for drains from roof-water leaders.

The above is more or less common practice in a number of cities, but the method of pouring the concrete is not, we believe, so usual. A batch concrete mixer is used (in this case a Foote mixer) with a chute for delivering the concrete. The mixer is self-propelled and can be steered by a wheel within easy reach of the man who operates the engine and drum. The chute is set nearly at right angles with the direction of travel of the mixer and the mixer is maintained at such distance from the curb that concrete can be spouted directly into the curb forms without rehandling. By swinging the chute slightly, the concrete can be discharged into three or four feet of curb, and flows and is drawn by a hoe into three or four additional feet of curb. When this length of six or eight feet has been filled with concrete to the desired height, the mixer is moved ahead about that distance, either while a new batch is being mixed or while the concrete is being discharged.

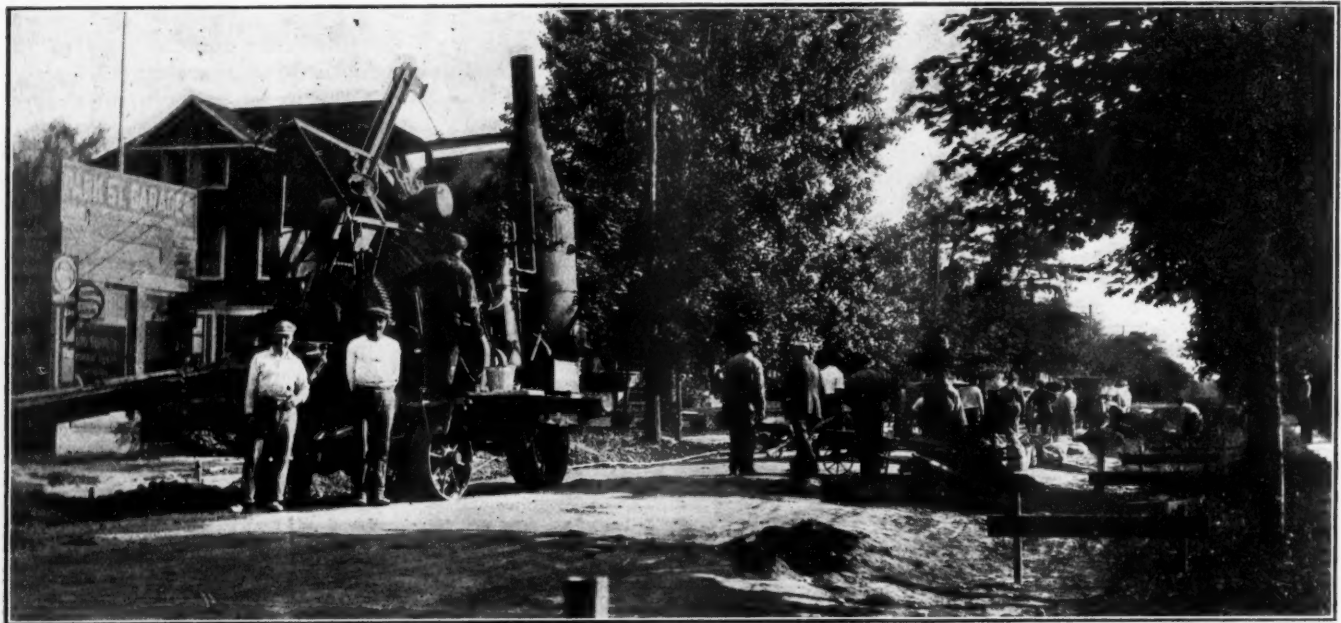
The sand-stone, and cement have been delivered along the street in such quantities and at such intervals as are necessary to just provide the amounts required for the curb construction without leaving any considerable amounts of material unused upon the streets. As a matter of fact, practically no stone and only small amounts of sand were found along the street after the mixer had passed. The sand and stone, three wheelbarrows of the

former and five of the latter to a batch, are wheeled to the loading hopper in the ordinary manner, except that the maximum distance hauled seldom exceeds twenty-five feet, and becomes less and less as the mixer approaches the pile from which the supply is being drawn. As a matter of fact, the one man to each wheelbarrow does not seem to be occupied more than half the time, although it is not apparent how this can be avoided without some change in the general plan.

The concrete is mixed from one minute to one and a half minutes. The time of discharging the same is somewhat greater than in paving foundation work, since it is not allowed to flow into the curb forms quite as rapidly as it can be discharged onto a street for foundation work. The average time for mixing and discharging a batch probably averages about four minutes. Taking the average by the day, however (there are numerous delays, including that required for lengthening or shortening the pipe bringing water from the nearest fire

hydrant to the boiler, shoveling out of the way of the mixer's wheels any small piles of sand or stone that have not quite been used up for the concrete, etc.), the average for the day is about ten or twelve batches an hour. Since the opening between forms through which the concrete is discharged is only 6 inches wide, to insure that all the concrete enters the form, a hand-operated plate of steel or short chute is used by two men to direct the concrete into the form as it leaves the end of the chute. This is done so successfully that very little concrete is spilled outside the form. A third man stands opposite the end of the chute and with a hoe pushing back or drawing out the concrete as it flows in the chute regulates the rate at which it is discharged.

It would seem to be practicable to pour the form practically level full in this way, but on this piece of work the concrete is brought up only to within about eight inches of the top. Immediately following this, a mason with two helpers plasters mortar for a face finish on the



CONCRETE MIXER, SAND AND STONE GANG. GRADE AND LINE BOARDS AT RIGHT.



FORM FOR CURB.
Joint plates and clamps just above them, and braces against the ground. Sidewalk and sodded space at right, roadway at left.

front form from the top down to where the concrete has already been filled, and the top eight inches, more or less, of the form is filled, by hand from piles of concrete that are deposited on the road surface by the mixer at sufficient intervals. This hand-deposited concrete is brought up slightly above the tops of the forms, so that when lightly tamped and the surplus water squeezed out, the concrete will stand sufficiently high to permit the top to be struck off. While the concrete is being deposited in the form, a man with a flat steel plate on a long handle "spades" the large stone back from the rear and end faces of the curb, while another with a tamper of iron, about two by six inch face and one inch thick, lightly tamps the concrete. Following this, one man drives into the fresh concrete the protecting bars that are used along the front edges (these bars are furnished by the Clip-Bar Company), another man strikes off the top with a long straight edge, while a third trowels down the top surface. Twenty-four hours later, the clamps and braces are knocked loose and the forms removed from the curb, and any touching up of the face that is necessary is done at once.

This one mixer, mixing about a half cubic yard of concrete at a time (two bags of Atlas cement, three wheelbarrows of sand, and five wheelbarrows of stone), makes about one hundred feet of curb in an hour in the regular



DISCHARGING CONCRETE INTO CURB FORM.

Regulating rate of discharge with hoe and guiding concrete into form with hand apron.

run of work. If endeavoring to make a record, this rate could undoubtedly be increased considerably. On the other hand, when going around curves or doing other special work, this rate may be cut down more or less. The force used consists of three men wheeling sand, five wheeling stone, one supplying cement and supervising the loading, the engineer of the mixer, three men on the chute, one tamping, one spading, three applying concrete by hand, one mason and two helpers applying the mortar face to the forms, one putting in metal edges, and two finishing off the top; a total of twenty-four men.

EXTENSIONS OF PUBLIC UTILITIES FINANCIALLY CONSIDERED.

Income from Extension of Pipe Line Should Cover Depreciation and Profit on Plant Extensions as Well as on Additional Main Laid.

By J. W. LEDOUX.

At the New Orleans meeting of the American Water Works Association in 1910, the writer presented a short paper calling attention among other things to the danger of putting in water-works extensions without adequate returns.

Since that time there is good reason to believe that this subject has been receiving careful attention by many water-works engineers and superintendents.

In past years it was common practice for the water-works management to install at its own expense an extension where the revenue in sight did not exceed ten per cent of the cost of said extension.

It is the opinion of the writer that under ordinary circumstances it does not pay to lay a water-works distributing pipe extension unless the annual revenue obtainable thereon is considerably over 25 per cent of the cost.

An examination of the statistics of privately owned United States water-works plants shows that the distribution piping system upon which consumers are located will cost from 25 to 65 per cent of the cost of the entire works; 45 per cent representing probably a fair average. They show also that the entire cost of operation not including depreciation will generally range between 3 and 7½ per cent of the cost, a fair average being about 4½ per cent. This cost of operation will also be

seen to range between 25 and 75 per cent of the gross revenue, a fair average being about 45 per cent.

In these respects every water-works has its own particular characteristics. For many gravity plants as well as advantageously located pumping plants, the operating expenses, when considered as a percentage of the cost of the plant or of the gross revenue, are comparatively low.

The relative cost of the distribution system will depend largely on the number of consumers per mile of distribution pipe and the adequacy of the fire protection.

If a demand were made upon the water-works management to lay a pipe extension at a given location, the first consideration would be whether the pipe would be used for domestic and industrial use, fire service, or both. If the former, a large quantity of water will be consumed. If for fire service, scarcely any water will be consumed, so that at first sight it would seem that much less percentage of return on the cost of the extension will be required if the service is to be entirely for fire protection than if for water consumption, for the latter taxes the entire plant, while the former generally taxes only the distributing system. However, it is believed that it is not necessary to make any such distinction, except in special or unusual cases. Reasons for not making distinction between the two classes of service are becoming more apparent when it is considered that the modern tendency is to make the principal charge for fire protection an annual payment of a fixed sum per foot or mile of distributing pipe.

Let us assume that for a particular water-works system the cost is \$1,000,000, the cost of the distributing system is 45 per cent, or \$450,000, the gross revenue is \$135,000, and the operating expenses \$45,000. Let us assume a fair allowance for depreciation will be 1 per cent, or \$10,000. The net revenue will then be \$135,000 minus (\$45,000 plus \$10,000), or \$80,000, which is 8 per cent of the cost of the works.

Now let us assume a demand is made for a pipe extension, on which there can be counted with reasonable certainty a revenue of \$135 per annum. A reliable estimate shows the cost of the extension will be \$450. The revenue attainable will be from average consumers as well as the regular proportion for fire protection. Under these circumstances we can calculate the rate of return as follows: If the distributing system costs 45 per cent of the entire cost of the system, there must be added to the balance of the system, either before, at the time or after the installation of this extension \$550 worth of non-revenue-producing plant, if we wish to maintain the entire works in its standard condition. According to logical accounting methods the revenue-producing part of the plant must earn sufficient to pay the required rate of return on both it and the necessary non-revenue-producing part of the plant.

In other words, every time a distributing pipe extension is laid there must be furnished an adequate portion of a new reservoir, filter plant, pumping engine, boiler plant, building, force main, etc.; and there must be sufficient return to pay for all these things; otherwise when required there will be no financial means of obtaining them.

Every factory manager who has given the subject of scientific cost keeping any consideration knows that this principle is fundamental: The producing part of the organization must earn sufficient to pay all charges, including the upkeep of the non-producing part of the organization. All this is usually lumped under the title of "overhead" charges.

We, therefore, have cost of extension..\$ 450.00
Cost chargeable to balance of plant.... 550.00

Total cost.....\$1,000.00
Operating expense, 4½ per cent..... 45.00
Depreciation, 1 per cent..... 10.00
Return, 8 per cent on cost..... 80.00

Gross revenue required to maintain
8 per cent return.....\$ 135.00
The extension itself will then have to pay:
135
— 100 = 30 per cent
450

A simple formula universally applicable is
(O + R + D)

$$X = \frac{P}{100} 100 (A)$$

in which

O = per cent operating expenses is of total cost.

R = per cent rate of return is of total cost.

D = per cent depreciation is assumed to be of total cost.

P = per cent distributing pipe system is of total cost.

X = per cent guaranteed or estimated revenue on the extension is of estimated cost of the extension alone.

Another formula of somewhat more general application is as follows:

$$X = \$10,000 \frac{R + D}{P(100 - M)} (B)$$

in which all the terms have the same designation as before, and

M = per cent operating expenses is of gross revenue.

Tables A and B are calculated from formulas A and B, assuming the rate of return is 7 per cent and the depreciation 1 per cent on the total cost.

TABLE A.
Per Cent Distributing System Costs of Total Cost.

0 Per Cent. Operating Expenses is of Total Cost of Water-Works.	25	30	35	40	45	50	55	60	65
3.0	44	37	32	27	24	22	20	18	17
3.5	46	38	33	29	25	23	21	19	18
4.0	48	40	34	30	27	24	22	20	18
4.5	50	42	36	31	28	25	23	21	19
5.0	52	43	37	32	29	26	24	22	20
5.5	54	45	39	34	30	27	25	23	21
6.0	56	47	40	35	31	28	25	23	22
6.5	58	48	41	36	32	29	26	24	22
7.0	60	50	43	37	33	30	27	25	23
7.5	62	52	44	39	34	31	28	26	24

TABLE B.
Per Cent Distributing System Costs of Total Cost.

M Per Cent. Operating Expenses Are of Gross Revenue.	25	30	35	40	45	50	55	60	65
25	43	36	31	27	24	21	19	18	16
30	46	38	33	29	25	23	21	19	18
35	49	41	35	31	27	25	22	21	19
40	53	44	38	33	30	27	24	22	21
45	58	48	42	36	32	29	26	24	22
50	64	53	46	40	36	32	29	27	25
55	71	59	51	44	40	36	32	30	27
60	80	67	57	50	45	40	36	33	31
65	92	76	65	57	51	46	41	38	35
70	107	89	76	67	59	53	48	44	41
75	128	107	92	80	71	64	58	53	49

It is evident this method can be used for gas and electric light and power plants, and in fact the principle applies to operation of many kinds. Obviously for the term

"Cost" the appraised "Valuation" can readily be substituted.

Conclusions.

According to this discussion, as the operating expenses are likely to be between 35 and 55 per cent of the gross revenue, and the cost of the extensions is likely to be between 40 and 55 per cent of the entire cost of the plant; if the net earnings are to be maintained above 7 per cent plus depreciation, then it is not warrantable to install an extension unless said extension will earn from 22 to 44 per cent of the cost thereof.

SALVAGE OF WASTE MATERIAL IN ENGLAND.*

The National Salvage Council is now urging all local authorities to recover for utilization waste and dormant materials hitherto regarded as "refuse." A definite national use has been found for many of these articles, and by well-organized collections and proper treatment not only have national resources been conserved but a reduction has been effected in the tonnage required for the importation of new raw material.

Conferences with municipal authorities have been held in various cities. In certain salvage operations, such as detinning old cans, large authorities could put down a plant that neighboring small authorities or townships could utilize. (The Director of National Salvage is about to issue particulars as to the best method for dealing with this material, so as to reclaim not only the steel but also the tin and solder.)†

The advice given at the beginning of the war to "burn all refuse" is now obsolete. For instance, waste paper, properly utilized, saves a great deal of shipping. At present only one-third of the paper used is returned for trade use, although 365 trades are absolutely dependent upon paper. Some authorities are paying a bonus to their employees for bringing in waste paper from the refuse. In Shipley 80 tons of waste paper were collected during 1917, and that including rags, realized £641 (\$3,119). In Bradford last year 75 tons of paper were collected from various public departments in the city, and realized £430 (\$2,093). The pulping mills now established in the country are a valuable new industry.

A pamphlet has recently been issued to local authorities by the National Salvage Council offering many suggestions on the collection and utilization of waste and dormant materials. Among other things it states that organic refuse is needed for the extraction of glycerin and for feeding pigs. Grease traps to save the grease from dish washing at hotels, etc., are suggested. All available bone material should be saved; at present only about half such available material is recovered. Fish waste should have the oil extracted and a meat food suitable for feeding animals and poultry made from the residue; at Liverpool a plant has been installed for this purpose, and the fats obtained find a ready sale at £80 (\$389.32) per ton, while the meal is retailed at about £21 (\$102.20) per ton.

The municipal destructor works at Bradford is doing excellent waste-reclamation work. Ashpit refuse, after the old cans and scrap metal are sorted out, is utilized as fuel for operating the reclaiming machinery. The clinker from the furnace is ground into a coarse grit and sold for use in braking tramcars and the fine ashes are utilized in the manufacture of disinfectant powder. Animal refuse is subject to steam heat and disintegrated, yielding finally tallow, bone meal, and meat meal.

*From "Commerce Reports" of the U. S. Department of Commerce.

†As quoted in Municipal Journal for August 30th, 1917, the U. S. Bureau of Commerce last year stated that there were two detinning companies in this country and that the demand for tin chloride did not encourage the establishing of others.

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CONSUMPTION PER CAPITA OR PER CONSUMER.

The practice of stating water consumption in terms of gallons per day per capita was for years followed by all cities (who could give any consumption figures at all), and is still far the most common one. Several efforts have been made to introduce the practice of giving the consumption per actual consumer, and an increasing number of cities are adopting it.

Why superintendents have not generally adopted the plan it is difficult to understand. Per capita consumption is a figure of little value, while per consumer consumption figures are of the greatest. In some cases they are practically the same, but probably in not more than half are they even approximately so; and in a great many cases they are very misleading. A certain town reported a consumption of 10 gallons per capita; but on inquiry it was found that only 20 per cent of the population were consumers, and they used 50 gallons each. Of what value or interest to any one was the former figure when the facts were known? Another city reports 100 gallons per capita, but it supplies a large area outside the city limits, and the consumption per consumer is really only about 70 gallons.

As suggested in the article on Water Works Operation in this issue, opinion as to the existence of waste or leakage in a system if based on per capita consumption might be entirely erroneous. And this is only one of the directions in which such figures may be misleading. Except for water used for public purposes, there is not necessarily any relation between population and total consumption, and expressing the latter in terms of the former would seem to be illogical and altogether useless.

EVOLUTION IN REFUSE DISPOSAL.

What will be the effect of the war on methods of refuse disposal? There are few lines of industry or of human activity of any kind that are not affected by war conditions, and this is especially true of those in which food plays a part. It would be strange, therefore, if the methods of disposing of garbage did not undergo some change. Such as has occurred has been caused principally by the change in character of garbage due to food conservation, and the desire to utilize the garbage to the fullest extent.

The former has caused a considerable reduction in both amount of garbage and percentage of fats recoverable from it. The result is that the amount of salable products from garbage reduction, per capita of population, has fallen off 25 to 50 per cent. Fortunately for existing reduction plants, the prices obtainable for grease and fertilizer base (tankage) have increased by an even greater amount. But it is uncertain what will be the enduring effect of these influences. After the war the prices for reduction products will probably drop (a large part of the grease recovered is used for making the glycerine employed in manufacturing ammunition), and if the amount of fat in garbage does not increase proportionately, reduction plants will probably have to operate at a loss. Whether the people generally will quickly return to their former wasteful habits, producing a garbage much "richer" than was to be found in any European cities and which made it possible in this country alone to operate reduction plants at a profit, remains to be seen. Many believe, and most of us hope, that the thrift we are now learning will become a habit and be continued after peace has returned. But uncertainty on this point will probably prevent further construction of reduction plants either by private investors or municipalities until some definite conclusions concerning these two points can be arrived at, which can hardly be until some time after the conclusion of the war.

Conservation, however, demands that some use be made of garbage by cities that have no utilization plants and that it be not merely buried or burned. The most generally practicable solution seems to be feeding to hogs, concerning which we have published considerable matter during the past few months. Many cities in this country have taken up this matter, although private raising of hogs on garbage is still much more common than municipal; one reason, probably, being that most cities would have to go outside of their own limits to find a suitable site for a hog farm. (English papers state that in that country, however, some cities are even considering raising hogs in public parks.) An advantage of feeding garbage to hogs under present conditions is that the absence of fats does not detract from its value for this purpose, as it does from the return possible from reduction processes.

Whatever the change after the war, it seems probable that less garbage will be burned in incinerators in the future than has been done in the past. Some have gone so far as to say that no more incinerators will be built, but this we hardly anticipate, for we will still have enormous amounts of rubbish and ashes to dispose of, with the increasing scarcity in the larger cities of vacant land on which they can be dumped; which condition has led many cities to install incinerators even when all the garbage was otherwise disposed of. Here again, also, thrift will reduce the amount to be burned by decreasing the amount of waste and increasing municipal utilization of the salable matters in it.

As told elsewhere in this issue, contractors pay an

average of 5 cents per man per month for all the waste from the cantonments. If a city of 30,000 population could make a similar arrangement, it would receive \$18,000 a year for its waste matters, which should more than cover the cost of collecting them. The contractor of course expects to make a profit also.

From such considerations it would appear that the subject of waste disposal must receive careful consideration during the after-the-war reconstruction period, and that new habits and conditions may be expected to produce greater or less changes in past and present methods. Engineers have just begun to give serious attention and scientific study to the matter of refuse destruction and garbage reduction; but have not sufficiently considered refuse utilization. The entire subject, including collection, offers probably a more promising field for improvement than any other branch of municipal activity.

DESIGN AND OPERATION OF SEWAGE TREATMENT PLANTS.

**Recommendations Prepared by H. A. Whittaker,
Director of the Division of Sanitation of the
Minnesota State Board of Health.**

Volume and Character of Sewage: Before designing a treatment plant, a careful study should be made to determine the volume and character of sewage to be treated. When the sewers are already in use, actual measurements of the sewage flow should be made, covering a considerable period. A census of the actual number of sewer connections should be taken and a record made of the character and amount of sewage discharged from manufacturing plants, such as creameries, tanneries, gas plants, etc. The ground water flow should be measured or carefully estimated. The plant should be designed in accordance with the above data and with reasonable allowance for future growth. Where a new sewerage system is to be constructed, care should be taken to obtain good grades, whenever possible. Flush tanks should be installed wherever the grade of the sewer is such that it will not be self-cleansing at all times. The sewerage system should be so designed that the sewage will be delivered to the treatment plant in as fresh a condition as possible.

Grit and Screen Chambers: For small plants, where the sewerage system is of the separate type, removing house sewage only, grit and screen chambers may often be omitted to advantage. Grit and screen chambers are necessary where the sewerage system is of the combined type, and, when used, these chambers should be made easily accessible for cleaning.

Imhoff Tanks: (a) *Settling Chambers:* The settling chambers should be designed to hold the average flow of sewage for a period of two hours. Where the settling chambers are too small, the efficiency of the tank is decreased, and where these chambers are too large, fresh sewage may become septic before leaving the tank. The sloping walls of the settling chamber should be constructed as steep as possible; never less than 1.2 vertical to 1.0 horizontal, and, better still, 1.5 vertical to 1.0 horizontal. The walls should be smooth, with no projections. A baffle should be installed at the inlet end and a scum board at the outlet. These should be located approximately 1 to 2 feet from the inlet and outlet ends of the tank, respectively. They should extend across the tank and to a depth of about 12 inches below the surface of the sewage. The invert of the inlet pipe or pipes should be at an elevation of a few inches above the surface of the sewage. The inlets and outlets should

be so located as to distribute the flow as much as possible across the entire section of the settling chamber. Outlet weirs should be relatively narrow. Very wide weirs are not desirable, since it is difficult to keep them clean.

(b) *Sludge Compartments:* The sludge compartment should be of generous size. For Minnesota conditions, where the winters are long and severe, a part of the sludge must remain in the tank for nearly a year. It is the opinion of the Division of Sanitation of the Minnesota State Board of Health that sludge compartments should have a capacity of at least two cubic feet per capita. In computing the size of the sludge compartment, only that portion should be considered that is below a horizontal plane two feet below the slot or slots in the bottom of the settling chamber. The sludge will not flow a great distance horizontally to the sludge removal pipe. In large tanks, two or more sludge removal pipes should be provided.

(c) *Covering:* Tanks should be **uncovered**. Light, easily handled, wooden covers should be provided for winter use. The entire plant should be surrounded by a tight, high ornamental fence, to keep out animals and unauthorized persons.

(d) *Operation:* The operation of a sewage treatment plant is a very important feature and one which is seldom given sufficient attention. A poorly designed plant under conscientious management will often produce better results than a well designed plant with indifferent management. Plants should be constructed so that all parts are easily accessible to the operator. It is frequently necessary to break up the scum which will collect on the sewage in the vents and to scrape down the walls of the settling chamber and push through the slots material which will adhere to the walls. Readings should be taken frequently to determine the surface of the sludge in the sludge chamber so as to know when and how much to remove. The sludge should be examined occasionally to determine whether or not it is acid or alkaline. An acid sludge is sour and foul-smelling and generally requires a long period for drying. Such a sludge should be treated with lime.

The operator should be provided with necessary tools and apparatus to care for his plant. The tools usually consist of a sludge scraper, used for the purpose of scraping down the walls of the settling chamber; a scum breaker, used for the purpose of breaking up the scum which may collect on the surface of the sewage in the vents; a skimmer, used for the purpose of removing to the vents scum which sometimes collects on the sewage in the settling chamber; and a sludge sampling apparatus, in order to determine the position of the surface of the sludge, and a set of Imhoff tubes with which the operator can determine roughly how the plant is operating. Each plant should be provided with a house of generous size in which the tools can be kept and in which the necessary analytical work can be performed. Attached herewith is a typical instruction sheet which is furnished to a municipality as a guide in the operation of the sewage treatment plant.

Pumping Machinery: Where it is necessary to pump the sewage or the sludge by pumps driven by electric motors, the motors, switch boards, or starting rheostats should be located in a building not directly connected with any part of the sewage treatment plant, since the condensation and moisture in the winter months is very heavy on all parts of the plant directly connected with the settling or vent chambers.

Sludge Drying Beds: Sludge-drying beds should be located as close as possible to the Imhoff tank. Where

it is necessary to conduct the sludge a distance of ten or fifteen feet horizontally to the drying bed, it should be allowed to flow in open channels rather than in pipes, since long sludge pipes are liable to become clogged with dried sludge. Where the sludge is removed from the tank by gravity, the sludge pipe outlet should be at an elevation at least six feet below the sewage in the tank. The sludge should be discharged onto the bed from an elevation at least two feet above the surface of the bed so that the sludge removal pipe can be drained after each removal of sludge. The sludge drying beds should be of generous size, having an area of not less than one square foot per capita.

Percolating Filters: Percolating filters, where necessary, should be of ample size, so as to prevent overworking. It should be remembered that in the colder climates, the bacterial action in the filters is much slower than in milder climates. Therefore, to produce the same results, filters must be considerably larger than would be necessary in a southern climate. Certain tests at Milwaukee, Wisconsin, indicated that, on very hot days, percolating filters could be operated efficiently at the rate of 4,000,000 gallons per acre per day, whereas, in colder weather, only 400,000 gallons per acre per day could be applied to obtain the same results. The Division of Sanitation recommends that percolating filters in Minnesota be designed to operate at a rate of 1,200,000 gallons per acre per day, where the average depth of stone is at least six feet.

Resettling Tanks: A resettling tank, having an average holding period of about one hour, shall be installed wherever percolating filters are used. This tank shall be provided with cross baffles. The bottom shall be hopper-shaped. Adequate provision for sludge removal shall be provided. The sludge-drying bed shall be constructed in a manner similar to the bed for drying the sludge from Imhoff tanks. This bed shall have a net area equal to at least one-half a square foot per capita.

Sand Filters: Sand filters have not been entirely successful under Minnesota conditions, due to freezing in cold weather. They cannot be operated at rates much exceeding 100,000 gallons per acre per day and require a great deal of attention.

With the exception of a very few cases, not much attention has been given to the appearance of sewage treatment plants. It is the opinion of the Division of Sanitation that some of the litigation brought on by alleged nuisances at sewage treatment plants could have been avoided had a little care been exercised in designing the plant so that it would have a pleasing appearance. A small amount of money expended in parking and landscape work at sewage treatment plants will do away with a great deal of the objection to them.

There are many phases of the sewage treatment plant problem which need investigation; such as the treatment of dairy and other trade wastes before admitting them to the sewage system; the disinfection of sewage, if necessary, to prevent its being the cause of injury to cattle pasturing along streams which receive sewage; and the question of installing mechanical apparatus for the purpose of breaking up scum, stirring the sludge, etc.

RULES FOR OPERATION OF IMHOFF TANKS.

Any material, other than sand and grit, which may collect in the inlet chamber, should be forced through the opening into the settling chamber. Sand and grit should be removed and deposited upon the surface of the ground. The inlet chamber should be kept clean at all times. Any material which rises to the surface of the sewage in the settling chamber which does not sink readily when broken up, should be removed to the vents.

Any sludge which deposits on the walls of the settling chamber should be forced through the slots into the sludge chamber. The walls of this chamber can be kept clean by daily scraping and forcing any adhering deposit through the slots.

Any scum which collects on the surface of the sewage in the vents should be thoroughly stirred up *daily*, so as to liberate the entrained gases and facilitate the settling of the solid material. If the scum in the vents should reach a thickness of over 6 inches, a portion of it should be removed. The surface of the sludge in the sludge chamber should never be allowed to reach a point higher than 2 feet below the slots, equivalent to a point about 9 feet below the surface of the sewage. The level of the sludge in the sludge chamber should be lowered about 2 feet each time the sludge is removed, except in the late fall, when about 4 feet should be removed, to allow for the winter's accumulation. The operator should be provided with a sampling outfit by means of which bottle samples of sewage in the sludge chamber can be collected at various depths and the exact location of the surface of the sludge determined.

The surface of the sludge should be determined at least once every two weeks.

Ice which may collect on the surface of the sewage in the settling and vent chambers should be removed immediately.

When the sludge on the drying bed reaches a depth of about 1 foot, it should be removed. Since a portion of the sand will adhere to the sludge removed from the bed, it will be necessary to replace the top layer of sand on the bed from time to time.

CONVICT ROAD WORK IN NEW JERSEY.*

Modern use of inmate labor on public roads was first undertaken in New Jersey in 1913.

At the outset considerable stress was laid upon the urgent need of safeguarding the men, but time has effectively demonstrated that exercising reasonable care from forces outside, as well as inside, is the most desirable, road camp life being a vast and helpful departure from the rigidity of confinement and segregation which necessarily obtains in the larger penal institutions. We have also learned that, when required along important work, the road camps may be established in a well populated region without bringing undue influence upon the morale of the men. Therefore, this knowledge has made it possible to contemplate the use of the labor along the more important routes, instead of contending with the earlier belief that the camps must be located in rather isolated sections, where the final result was a "philanthropic" use of the labor on unimportant work.

A very comprehensive system has been inaugurated for the administration and accounting of convict labor work throughout the state and the favorable results are already apparent. The plan includes accurate cost accounting as compared with the results obtained on the various items of work at the individual camps, which will be arrived at by daily reports from the respective camps; also the purchasing and ordering, through the central bureau, of the bulk of supplies, materials, equipment and property repairs for all of the camps and the checking of invoices for the same. More favorable prices and values and more prompt deliveries will evidently be the result and the central bureau will be in position to direct the shipment of costly but temporarily inoperative equipment from one camp to another where there is current need for same. A complete stock-keeping account will also be included in the work.

*From report of Robert H. Exton, clerk of convict labor, New Jersey State Highway Commission.

The WEEK'S NEWS

Government's Road Policy from One Council—New York's Pavement Repairs—Strike on Philadelphia Police and Fire Boats—New York's Police School Closed—Detroit's New Charter Wins Big Majority—War Finance Corporation Aids Brooklyn Transit Company—State Commission Has No Fare-Raising Power in Washington—United States Housing Policy Defined.

ROADS AND PAVEMENTS

Federal Council on Road Work.

Washington, D. C.—The United States Department of Agriculture has given out the following statements: "All functions of government agencies relating to streets and highways hereafter are to be co-ordinated in a body called the United States highways council, composed of one representative each from the War Department, the Department of Agriculture, the United States Railroad Administration, the War Industries Board and the Fuel Administration. The council was formed primarily to prevent delays, financial loss and uncertainty incident to the method of taking up each highway problem in its turn with a separate and distinct government agency. This council was constituted at the suggestion of the secretary of agriculture. Through the department it will continue the close contact already established, both formally by law and informally by practice, with the state highway commission in each state of the Union. Membership of the board follows: War Department, Lieutenant-Colonel W. D. Uhler; Fuel Administration, C. G. Sheffield; War Industries Board, Richard L. Humphrey; Railroad Administration, G. W. Kirtley; Department of Agriculture, L. W. Page. These representatives have selected Logan Waller Page, Director of the Office of Public Roads, Department of Agriculture, as chairman, and J. E. Pennybacker, chief of management of that office, as secretary. The council utilizes the organizations of the forty-eight state highway departments with their trained personnel and their knowledge of local conditions and provides a single agency where all highway projects calling for governmental action of any character, whether it be a question of finance, of materials, transportation, or of war necessity or desirability, may be dealt with. The council has provided a definite form on which applications for relief are to be made through the respective state highway departments, and has sent supplies of the forms to the departments. It emphasizes the great need of conservation of money, transportation, labor and materials by restricting highway and street work to most essential needs. It ranks maintenance of existing streets and highways first, reconstruction of badly damaged streets and highways next, and it places last new construction justified only on account of vital war or economic necessity."

Begin Lincoln Highway Improvement in Iowa.

Cedar Rapids, Ia.—The first permanently surfaced mile of rural Lincoln Highway in the state of Iowa will be open to travel in the fall of the present year unless unanticipated events prevent its construction. All provision has now been made for the building of a Lincoln Highway seedling mile in Linn county, seven miles to the east of Cedar Rapids. The cement for the construction has been definitely assured by the Lincoln Highway Association. By the unanimous action of the Linn county board of supervisors an application for cement for this construction was placed with the Lincoln Highway some time ago. The Lincoln Highway Association has arranged for its delivery from the Northwestern States Portland Cement Company, of Mason City, Iowa. Previous to the actual laying of the cement an inspection of the sub-grade and

drainage facilities will be made by an engineer of the Portland Cement Association, and actual construction will start at once thereafter. To encourage permanent construction upon the Lincoln Highway arrangements were made by the Lincoln Highway Association in 1914 with numerous cement companies for the distribution of sufficient cement to build one seedling mile in such communities where no such standard construction existed. The original contribution of the Northwestern States Portland Cement Company had a valuation of \$3,000. The 3,000 barrels of cement which will be used in Linn county are now valued at \$6,800. It is thought that the seedling mile which is to be constructed in Marshall county will also be completed before cold weather, thus giving to the Lincoln Highway in the state two prominent sections as a nucleus for further building. It is now considered a certainty in Linn county that considerable additional concrete building will be added to the Lincoln Highway seedling mile.

Investigates Street Conditions in New York City.

New York, N. Y.—An investigation has been made by the Bureau of Municipal Research, based on the area south of 14th street as typical of the more important commercial thoroughfares, revealing that "a well defined policy with due regard to the needs of commercial traffic" has not been followed. Two features of the paving situation in that area, said William A. Bassett, of the bureau, has been: "(1) The serious condition of the pavements along the North River waterfront, including both West street, the marginal ways and certain of the crosstown streets which serve as feeders of those important thoroughfares. (2) The occurrence of considerable area of pavement in immediate need of paving between well-paved sections on streets where traffic is uniformly heavy." Mr. Bassett has made an analysis of the city's expenditures for pavements, based on the statistics of the Bureau of Municipal Research. He says in part: "During the past five years the area of pavement of all kinds laid south of 14th street, the cost of the paving and the percentage that this figure represents of the total amount expended during those years for the entire borough are as follows:

Year	Area Paved Square yds.	Cost	Per Cent
1913	227,100	\$1,122,505.57	44
1914	153,144	672,892.65	56.7
1915	56,865	242,557.93	37.3
1916	32,019	154,635.59	11.6
1917	111,311	462,326.09	23.4

"That these expenditures have been inadequate to keep pace with the needs of the city is forcibly illustrated by the progressing increase of area requiring repaving on many of the important commercial streets. As a result of an energetic campaign by the president of the Borough of Manhattan that borough secured two million dollars for repaving work during 1918 out of a total of three million and a half provided for the entire city. An analysis of the proposed distribution of this sum through the Borough of Manhattan shows that approximately \$988,919 is to be expended in the area south of 14th street. Of this amount \$271,739 includes work to be paid for by assessment. The remainder, which is to be expended on those streets not subject to assessment, comprises \$717,179, or approximately 35.8 per cent. of the two million allowed for the repaving

over the entire borough." The report continues: "The plain facts of the case are that the city is suffering from the lack of any definite, consistent paving policy in the past, together with the absolute inadequacy of funds made available for that class of work. It has been estimated that the average lease of life of pavements in Manhattan is fifteen years. Thus, in order to keep the 456 miles of paved streets in that borough in suitable condition and to prevent the necessity of repairing old pavements beyond the point of economy, there should be laid, under normal conditions, at least thirty miles of new pavements. Furthermore, it is estimated that in order to make up during the next ten years for the inadequacy of paving work done in the past forty miles of repavement should be done in that period at an annual expenditure of about four million dollars."

SEWERAGE AND SANITATION

To Begin Work on Erie Creek Improvement.

Erie, Pa.—The Capital Issues Committee of the War Finance Board at Washington has approved the issuing of \$100,000 of bonds for the improvement of Mill Creek. City solicitor Gilson was sent to Washington to get that body's permission. Council has received bids on the bonds. The Fohlwell, Alskog Company of Chicago, successful bidders on the improvement, have notified council that if the bonds are not sold they will take the difference that the city has in money on hand and the amount of the bid in the bonds. This company was low bidder for the section of the tube 21st street, south, to the city limits, at \$39,543.75. The preliminaries of the work have been begun.

Sewer Company Allowed to Raise Rates.

Ocean City, N. J.—Restating the view that under judicial interpretations of the law it is not compelled to observe franchise provisions where rates are unreasonably low, the public utility commission at Trenton has filed an opinion granting permission to the Ocean City Sewer Company to put into effect a new schedule, which will afford it additional revenue. An analysis of the present rates indicated that the company is not deriving an adequate return upon the capital invested.

Aldermen to Enforce Sanitary Regulations.

Columbus, Ga.—Every effort will be put forth by the sanitary committee of the city council and city health officer M. A. Blandford to ward off any epidemic of sickness this summer. There will be no let-up in the prosecution of those who risk their own lives and the lives and health of others by their violation of the sanitary laws of the city. The sanitary committee has divided the city into three zones, and one of the members has been appointed over each zone to see that the sanitary laws are obeyed. The aldermen are: W. A. Hendricks, Jim Stephenson and G. L. Sheram. These men will do all in their power to see that the sanitary laws of the city are strictly obeyed, especially in regard to old wells, old lumber, surface closets, stagnant water or cans. Members of the sanitary committee are emphasizing particularly the necessity of keeping down flies and mosquitoes.

WATER SUPPLY

City Wins Reservoir Land Condemnation Case.

Providence, R. I.—Questions concerning the constitutionality of the act under which the city has condemned the land to be used for the purpose of establishing a water supply by means of a great reservoir in the town of Scituate have been decided in a supreme court opinion in the three cases brought by the Joslin Manufacturing Company and allied interests in accordance with the contentions of the city treasurer and water supply board. Judge Stearns holds that the act is not only constitutional upon the points raised, but that it shows an intention on the part of the legislature to deal fairly and justly with the various parties in interest. The Joslin Manufacturing

Company, Theresa B. Joslin and the Scituate Light and Power Company filed the equity suits against Walter L. Clarke, city treasurer of Providence, and the members of the water supply board. The bill of complaint in each case alleges that certain provisions of the act are in conflict with the provisions of Article 14 of the amendment to the Constitution of the United States and of sections of the Constitution of Rhode Island. The suits were brought to enjoin the respondents from taking possession of or interfering with the property of the complainants under condemnation proceedings. The court finds that these sections have no bearing on the questions. The court cites the case of John H. Spears vs. The City of Akron, in which Mr. Justice Brandeis of the supreme court wrote an opinion in March of this year, sustaining the lower court in dismissing the bill of complaint. This case is strikingly similar, says Judge Stearns, in many respects to the Joslin cases, "and the decision of the supreme court gives a conclusive answer to the principal contentions of the complainants. In regard to the provision for compensation, it is to be noted that the complainants in this case have additional security to that which was given under the Ohio act, in that provision is made under the Rhode Island act that an execution for an award or upon a verdict for damages shall run against the city." After discussing the several points raised by the questions certified, the opinion concludes as follows: "The act in question, considered as a whole, shows an intention on the part of the Legislature to deal justly and fairly with the various parties in interest. Alternative methods for the settlement of damages are provided and the provisions for the payment of damages are clear, certain and adequate."

City Declares Commission's Ruling Illegal.

Phoenix, Ariz.—Alleging that the order entered by the state corporation commission requiring the city to reinstate the rates, rules and regulations in effect for the service of water to consumers outside the city limits prior to the change whereby consumers were required to install at their own expense meters necessary to serve them, was without the authority of law, the city has instituted court action against the commission. The complaint asks that the commission be enjoined from in any way attempting to enforce the order or from interfering with the city in operating of water works system or in collection and making rates for service of water or the enforcement of the city's ordinance. On April 10, 1917, David B. Harrer, a non-resident consumer of water supplied by the water works, filed in the superior court an application for a writ of mandamus to compel the city to furnish him water at the rate and in the manner prevailing prior to the adoption of ordinance 174. The judgment rendered in the superior court dismissed the writ. Prior to filing the case in the superior court, Harrer filed a complaint in the office of the corporation commission, asking that the city be required to allow the water to continue to flow through the city pipe lines and that the city be required to place a meter, if a meter was desired by the city, at its own expense. The city filed a motion for dismissal for the reason that a municipal corporation is not within the jurisdiction of the corporation commission, the commission ruling against the city. On the ground that all matters and things in dispute were adjudicated by the superior court, the city brings the new action.

STREET LIGHTING AND POWER

New Rules for Utilities Asking Higher Rates.

Trenton, N. J.—The state board of public utility commissioners has announced the following new and important rule, designated as No. 15: "Before any public utility owning, operating, managing or controlling any street railway, gas, electric light, power, sewer, water or telephone plant or equipment for public use within the state of New Jersey shall increase any existing rate or schedule, or change or alter any existing classification, the said public utility shall at least twenty days prior to the date, when it is proposed that said increase, change or alteration shall

become effective, give written notice to the board of public utility commissioners by submitting to the board by mailing to its office at the state house, Trenton, or by delivery thereto, a statement containing the following: (1) The name of the public utility, the municipality or municipalities in which it operates, and the nature and extent of the notice given by the said public utility to those who would be affected of its intention to make the increase, change or alteration. (2) A statement as to the rate schedule or classification it is proposed to increase, change or alter and the increase, change or alteration proposed. Information as to this may be given by repeating the existing rate, schedule or classification, or by making such reference to the same in the files of the board, as will readily admit of its identification, and explaining in writing the proposed increase, change or alteration. (3) A statement of reason why the increase, change or alteration is proposed. If it claimed that this is due to need of additional revenue, the statement should give the appraised value of the utility's property, its funded debt, other outstanding obligations, amount of capital, amount of revenues, operating expenses, interest payments, rentals and dividend payment on capital stock for the three fiscal years immediately preceding and should state specifically what changes have occurred making it necessary to obtain increased revenues. If it is claimed that this is due to increased operating expenses, the statement should be as far practicable in such form, as will admit of revenues and operating expenses being compared with a corresponding period during the three years immediately preceding. At hearings held on petitions now filed, or which may be filed hereafter, statements of the things referred to herein must be properly supported by testimony."

New Rate for City Gas System.

Palo Alto, Cal.—The railroad commission at San Francisco has fixed a new gas rate for the gas which the city of Palo Alto purchases at wholesale for redistribution in the city's gas distributing system. Palo Alto has operated a municipal gas plant and gas system since September, 1917, and the rate fixed by the commission is for the gas which the city buys from the Pacific Gas and Electric company through its long transmission and main from San Francisco. Palo Alto is a very large consumer, and to this extent claims a favorable rate. On account of the constant changes that are taking place on oil, it was deemed desirable to make the rate flexible, and a base rate has been fixed to which further charges will be added according to the price of oil. The following rate was fixed for wholesale service for the city of Palo Alto: Sixty-two cents a thousand cubic feet for the first 5,000,000 cu. ft. a month. Forty cents a thousand cu. ft. for all over 5,000,000 cu. ft. a month, plus 2 cents a thousand cubic feet for all gas consumed for each 10 cents a barrel that the average price of oil at the Potrero plant of the company exceeds \$1 a barrel. With the present cost of oil at \$1.62 a barrel, the city of Palo Alto will pay an average of 72 cents a thousand cubic feet for its gas.

Court Orders Company to Extend Mains.

New York, N. Y.—Justice McAvoy in the supreme court has granted a writ of mandamus, compelling the New York and Queens Gas Company to extend its mains and service to Douglaston, Douglas Manor and Little Neck. The proceeding was brought by the state public service commission, which had issued an order directing the gas company to supply gas to these places, which the company declined to do. The gas company contended that it should not be required to furnish gas to the communities, as it would be against the wishes and policies of the War Industries Board, in that it was an unessential undertaking at this time. Also, the company argued there was no present necessity for gas in those places. The gas company claimed that the minimum cost of a transmission and distributing high pressure system would be at least \$135,000, and possibly much more, were the company compelled to comply with an order issued on February 1 of this year by the public service commission. It is claimed by the gas company that the actual cost of manufacturing and delivering gas to the Douglaston community would

be not less than \$1.42 per thousand cubic feet, which would not allow any return whatever on the company's investment. The cost of this gas, including a return of a mere non-confiscatory rate of 6 per cent on the investment, assuming \$150,000 as the cost of transmission and distributing mains, would be not less than \$3.26 per thousand cubic feet. A statement issued by the gas company reads: "To comply with the commission's order to supply gas from Flushing, the New York and Queens Gas Company says, would result to it in a yearly loss of \$11,000. This would be equal to a loss of \$2.26 on every thousand cubic feet of gas sold in addition to the present loss of \$74,472.11 per annum on the reasonable value of the gas company's property."

FIRE AND POLICE

River Front Unprotected When Boatmen Strike.

Philadelphia, Pa.—Real consternation was caused among the public safety officials when, following formal resolutions, the pilots and engineers on the police and fire boats dumped their fires and walked out, leaving the river fronts, with important munitions and war work plants, unprotected from fire and thieves. On the same day fifty-five out of fifty-seven line and conduit men and thirty operators in the electrical bureau, which connects every telephone in city hall, went out, demanding higher pay. Only one police boat was left in service after a crew for it was found, and this was detailed to go to an important shipping point for government supplies at the request of federal officials. Aroused by the danger of conflagration along the river front, director of public safety Wilson and superintendent Robinson sent out a hurry call for engineers and pilots. He finally announced that he would be prepared to pay the men who will go into service the difference between the sum of \$1,300 for pilots and \$1,350 for engineers, which was the old allowance, and the sum of \$1,800, which was demanded by the men who went out on strike.

City Gets Fire Boat.

Newark, N. J.—The Christina Baird, Newark's first fire-boat, has been accepted on behalf of the city by director Brennan of the department of public safety, after a trial in which it pumped a good-sized stream of river water. The boat is fully equipped with hose and nozzles. The Christina Baird is a tug chartered by the year from the New York & Newark Towing Line by the city for \$6,500. She will be available for towing on the river during the day, but will answer all fire alarms from river front boxes. A gong is to be placed on the dock and so that the captain of the tug when it is out in the river may know of a fire. Sirens will be placed on the bridges over the Passaic.

Police School Closed During War.

New York, N. Y.—New York's police training school, from which the department has been accustomed to draw men to fill vacancies, has been closed until the end of the war. All candidates eligible for admission to the school are within the selective draft age, and for this reason the school will be closed. An announcement to this effect was made by police commissioner Enright, at the graduating exercises for a class of fifty men in the gymnasium at police headquarters. Hereafter the police department will have to depend for recruits upon the members of the former Home Defense League, now known as the Police Reserves.

All Department Called Out to Business District Blaze.

Woonsocket, R. I.—The mercantile and office building district of Woonsocket was threatened by one of the most disastrous fires in years, damage estimated at \$85,000 being caused by the blaze, which broke out in a four-story store and office building. The roof and two upper stories of the building were ruined by the fire, and the contents of the clothing store and restaurant on the first floor and offices and other establishments on the second floor were badly damaged by water. The loss is believed to be practically covered by insurance. Among the offices damaged

by the fire were those of Willard Kent, civil engineer, and well known as the secretary of the New England Water Works Association. Heavy rain aided considerably in preventing the blaze from spreading to other buildings. The firemen were on the scene five hours. The department laid eleven lines of hose, four supplying a big turret pipe. All of the available fire apparatus and every member of the department of the city were called out. Five hose wagons and three hook and ladder trucks were on the scene.

Concrete Building Helps Fighters Stop Fire.

Wallace, Wash.—Fire in the warehouse district of Wallace, along the railroad tracks, in early morning, caused a loss of \$25,000 to \$40,000, and a stiff breeze, blowing down Nine Mile canyon, caused the blaze to threaten the residence part of town. The fire started in a locality where two other mysterious fires have originated within a year. Its origin is not known. It is believed to have started in the warehouse of the United Stores Company, about the farthest of the buildings up the canyon. With a wind coming down the canyon the fire had every opportunity to sweep everything before it. It was stopped, however, by a concrete building belonging to a fruit company. Good work was done by the fire department, but the water pressure was poor. Water had to come from the lower district of the city because the system for higher levels is not completed. A number of warehouses were damaged. Three or four residences also were destroyed.

Many Homeless Through Stubborn Fire.

Detroit, Mich.—Two rows of houses in a foreign section, one occupying practically an entire block, the other consisting of seven two-story frame flats, were gutted by two fires, causing an aggregate loss estimated at \$125,000. One fire, originating in a small shed, routed forty families to the sidewalk with what belongings they could hastily gather. The flames were first observed bursting from a ramshackle wooden shanty in the rear of one of the houses. Before the apparatus which responded to the first alarm had reached the scene they had spread south, eating through the row of sheds and igniting the roofs of frame flat houses. The tinder-like quality of the adjacent structures on all sides rendered the danger of a general conflagration imminent, and a "double-six" alarm was turned in, calling out all available apparatus. The firemen had a difficult time keeping the blaze within bounds. The other fire occurred two hours earlier, starting in a two-story frame house and spreading rapidly west, gutting several buildings.

GOVERNMENT AND FINANCE

Overwhelming Approval for Detroit's New Charter.

Detroit, Mich.—By a huge majority of 27,758—the vote being 32,297 for and 4,539 against—the voters signified their approval of the new charter at the recent special election. The charter carried in every precinct. The total vote brought out was considered good because of the greatly changing population in the city. The designers of the charter worked for a plan to fix responsibility. The mayor is given large powers of control, and will be responsible directly for all branches of the government. The electorate will receive power through the initiative, referendum and recall. Instead of the present council elected by wards there will be a council of nine elected at large. The elections will be non-partisan. There will be no ward lines except for convenience in making assessments, election of constables, selection of jurors, etc. No official will be allowed to campaign for another office until he resigns from his present one. The mayor will have authority to appoint, without confirmation by the council and for indefinite terms, which means during pleasure, the street railway commission, the commissioner of purchases and supplies, the commissioner of public works, the police commissioner, the commissioner of parks and boulevards, the commissioner of building and safety, the corporation counsel and the city controller. This will give the chief executive of the city absolute control of all these officials.

They must carry out his policies. In somewhat lesser degree the mayor will be able to control and will be responsible for all the other city departments, for he will appoint, without approval of the council and for definite terms, the members of the public lighting commission, the commissioners of the house of correction, the members of the board of fire commissioners, the members of the city planning commission, the members of the civil service commission, and of the board of health, and of the board of assessors, and of the water commission, and of the arts commission, and of the public welfare commission, and of the recreation commission. A department of purchases and supplies will be created to buy for all departments. A trial board in the police department will hear all complaints against inattention on the part of the police. A single commission will have charge of all buildings, safety engineering and building permits. The charter was won after a stirring campaign, led by the Citizens' Charter Committee, of which Tracy W. McGregor was chairman, Lent D. Upson was secretary and Pliny W. Marsh was campaign manager.

Judge Disregards Experts in Condemnation.

New York, N. Y.—Supreme court justice John V. McAvoy disclosed, in his opinion on the first street condemnation tried before him, an unwillingness to depend upon the testimony of experts in making awards, and to use his own judgment to a large extent, especially when the property is in the Washington Heights section, where justice McAvoy lives. He heard a proceeding to condemn property being taken for a "service street." After testimony had been offered justice McAvoy walked over the property affected, and noting that no sales had been made there in recent years he decided that the prices fixed by the owners and their experts were out of proportion to the values fixed by the city's experts. By his decision that the total cost to the city should not be more than \$270,000 he saved nearly as much for the city.

Voters Approve Special Levy.

Bluefield, W. Va.—By a vote of 258 to 144 in a special election of little attraction the citizens gave the council power to impose a levy for the ensuing two years to take care of the recent increase granted the water company by the public service commission and to make needed improvements. The state public service commission recently entered a tentative order granting the Bluefield Water Works and Improvement Company an increased revenue of \$10,000 a year, but suggested to the company, the city officials and citizens of Bluefield that they decide on the way in which the revenue was to be raised, whether by increase to the individual consumer or whether the city should assume the burden in the matter of fire protection, the commission suggesting that the individual consumer was already paying 90 per cent. of the gross income of the water company and that the fire protection charge against the city was low in proportion to other cities throughout the country and should be probably 40 per cent. instead of 10 per cent. as heretofore. Acting on this suggestion, and knowing that it was impossible to take care of the increase out of the usual levies, the council and mayor took the matter up with the chamber of commerce and the labor council of the city, and these two bodies appointed committees that worked out the levy plan which was adopted as being the most equitable manner in which to handle the increase, and which placed the burden on property instead of the individual, as property is the greatest beneficiary from the fire protection afforded. The committee and the city officials then added the matter of extension of the fire-plug system, as the cost to the city would not be increased after installation and the benefits from this permanent improvement would greatly surpass the money expended by decreasing fire insurance in many sections. The high-power engine and additional station were added for the same reasons. The matter of installing an incinerator plant is absolutely necessary, as the state health department has given the city officials notice to discontinue the dumping ground now maintained in the

east end of the city. The county has agreed to give the council \$3,000, to be applied on the construction of this plant, in consideration of discontinuing the dumping ground and deeding the county the right of way for the present roadway through the property. The levy voted for makes an increase on the face of 17¼ cents tax on the hundred dollars, but the city council will drop ten cents of the special levy laid last year, making the net increase in tax only seven and one-quarter cents for the next two years, during which time the improvements are to be made.

TRAFFIC AND TRANSPORTATION

U. S. Aids Transit Company.

New York, N. Y.—The War Finance Corporation at Washington has decided to make a direct loan of \$17,820,000 to the Brooklyn Rapid Transit Company. This advance is based on a plan requiring holders of the company's notes to consent to exchange not less than 70 per cent of the face amount of notes for new three-year 7 per cent gold secured notes of the company. The loan by the War Finance Corporation is for the purpose of enabling the company to meet maturing 6 per cent notes to the amount of \$57,735,000 coming due July 1 this year. The War Finance Corporation will take the three-year 7 per cent gold notes of the company at par as security. The War Finance Corporation has expressed its readiness, in case of the consummation of the proposed plan for the extension of the maturing notes of the Brooklyn Rapid Transit Company, to make advances in proper cases to banks, bankers, and trust companies, as provided in Section 7 of the War Finance Corporation act, upon the new three-year 7 per cent secured gold notes of the Brooklyn Rapid Transit Company. The new notes will be secured by the collateral now deposited as security for the present notes and by \$39,000,000 additional bonds of the Brooklyn Rapid Transit Company to be issued under a consolidated and refunding mortgage recently approved by the stockholders of the company. The proposed advance will therefore only be made in case the holders of the maturing obligations lend their co-operation by extending at least 70 per cent of their holdings. The Board of Directors of the War Finance Corporation has determined that this application presents an exceptional case for a direct advance which comes within the meaning of the "exceptional cases clause" contained in Section 9 of the War Finance Corporation act. The War Finance Corporation has received letters from the Controller of the City of New York and from the Public Service Commission of the First District of New York expressing a desire that the application of the Brooklyn Rapid Transit Company be granted in the interest of the city.

City and Contractors Agree After Strike.

New York, N. Y.—Following more than a week of total suspension of work on the subway lines under construction, the men returned to work after an agreement was reached between the city authorities, the public service commission and the contractors. About 5,000 men struck for higher pay and the contracting companies, admitting the reasonableness of their employees' demand, complained that bankruptcy faced the contractors if the demands were granted and asked the city to pay the increase. Mayor Hylan and the board of estimate refused, while the public service commission agreed with the contractors. While the deadlock appeared hopeless, the men walked out. Protests came from civic bodies and others against delay in completing the urgently needed subways and the \$40,000 daily loss of interest charges by the city. After conference, charges and recriminations, the city officials agreed and the men returned. The union leaders were notified that all their demands were granted, even including one for a closed shop. Both the board and the commission gave ground in the final agreement. It was decided that there should be no general cancellation of contracts and release of securities, but that such contracts as it might be deemed advisable to cancel under the Lockwood law should be cancelled. Furthermore, it provided that a contractor who so desired could apply for relief under the Lockwood

law "without prejudice," provided he continued to work on diligently to complete the contract in hand. It was provided that in the case of any contractor who declines to proceed according to the plan set forth the Public Service Commission immediately proceed to complete the work under the terms of such contract, employing the necessary labor and utilizing the available plant of the contractor. Contractors having claims must present them forthwith for consideration and adjustment. Contractors who have no claims for damages or delay and whose time for performance has not expired may have their contracts modified or supplemented upon their agreeing to complete the work within a shorter period than now required and as a consideration to receive therefor a sum of money that will equal the increased cost of labor and material made necessary by the war. All agreements of any kind modifying existing contracts must be consented to by the sureties.

Court Decides Against Commission's Fare-Raising Power.

Tacoma, Wash.—The state court at Olympia has handed down a decision denying the application of the Tacoma Railway & Power Company for a writ directing the public service commission to investigate the company's financial condition, and to raise fares or grant other relief necessary. The court holds that the public service commission has no authority to permit railways to charge more than a five-cent fare within the city limits, or to relieve a company of any of its franchise obligations. According to the decision, the public service commission act limits the authority of the commission, and specifically provides that not more than a five-cent fare shall be charged within city limits by a railway serving the community. The court decides that the act does not give the commission authority to relieve the companies of any franchise obligations, and declares that the remedy of the companies is legislative rather than judicial. The court holds that the public service commission has power to regulate rates so long as these do not exceed 5 cents, and to require adequate and sufficient service within this limitation, having due regard to the right of the company to earn a reasonable return upon the value of the property devoted to public use. This language is interpreted to mean that while a railway cannot avoid payment of gross earnings tax, paving charges, contribution to the cost of bridges, and other requirements included in the franchise it accepted, and may not charge more than a five-cent fare, it can be required to furnish only such service as it may under these conditions and still earn a reasonable return upon the value of its investment. In case of congested traffic, it will remain for the commission to decide whether the company can be ordered to operate additional cars, or otherwise improve its service, within the statutory restrictions, as to franchise conditions and fare limitations which the court holds to be clear and decisive. The court sustains the power granted cities by the enabling act of 1890 to authorize or prohibit the construction of railways upon its thoroughfares against the contention of the railway interests of Seattle and Tacoma that through the public service commission act the police power of the state had later been extended over franchise jurisdiction. The franchise right is held to be a clear and specific grant by the state to the city of authority to impose terms and conditions upon which its streets may be used, a transfer by the legislature to the city of the whole of the state's police power for this purpose. The court in part says:

"Whether the Legislature has power to confer upon the Public Service Commission the right to abrogate conditions in franchises to street car companies which had been granted prior to passage of the Public Service Commission law is not before us and we neither express nor intimate an opinion thereon.

"The public service law is remedial legislation and should be given liberal construction for the purpose of carrying out the will of the Legislature, but the rule of liberal construction does not mean that the court shall write conditions and provisions into the statute where the Legislature has passed none, or write out of the act a section which the Legislature has placed there when the various sections of the statute are not in irreconcilable conflict and may be harmonized."

J. B. Howe, general counsel for Stone & Webster, had argued that section 25 of the public service law, fixing street car fare limit at 5 cents and section 53 of the same

act, requiring adequate, sufficient service upon condition that the company be able to earn a reasonable return upon its investments, were in conflict when it had been proved to the commission that the company could not furnish adequate service when its income was not sufficient to pay a reasonable return, and that section 53 as the latter enactment, took precedence over 25. The court holds section 25 to be an express mandate of the legislature that fares are not to exceed five cents and there was no intention by section 53 to confer power upon the commission to abrogate the express declaration. By assuring the company a reasonable return within the franchise conditions and fare limitation imposed the court brings the two sections into harmony and holds the act thus declarative to the plain intent of the legislature. The case came up from Tacoma on application by the Tacoma Railway & Power Company for a writ of mandate directing the public service commission to order adequate service, regardless of franchise requirements and fare limitation, if the commission found these prevented the company supplying such service. In a previous hearing the company had pleaded better service impossible on present earnings. Commissioners F. R. Spinnings and A. A. Lewis rendered a majority opinion holding the commission powerless to abrogate franchise requirements and to increase the fare above five cents. At the same time they declined to order increased service on the company's showing of inability to do so on its income and still make a reasonable return. Chairman E. F. Blaine held the commission to be invested with power to abrogate any franchise or fare conditions that prevented the rendering of adequate service.

MISCELLANEOUS

Government's Housing Policy.

Washington, D. C.—Under authority given him by Congress in the Overman act, authorizing necessary changes in offices, bureaus, etc., President Wilson has placed war housing activities under secretary of labor Wilson. Work will be begun immediately on the various projects which have been under consideration by the bureau of industrial housing and transportation of the department. This bureau, of which Otto M. Eidlitz was appointed director in March by Secretary Wilson, will be in charge of the administration of the appropriation of \$60,000,000, \$10,000,000 of which is for housing within the District of Columbia. Mr. Eidlitz has announced that housing projects in Washington would probably embrace a site on the plaza, near the Union Depot, and on Twenty-third and Twenty-fourth streets, adjoining the building of the War Industries Board. The plans contemplate the erection of comfortable, sanitary, single-room dormitories for women. Cafeterias will be conducted in connection with the buildings, and there will be ample recreation facilities and safeguards for health and comfort. It is estimated that these two sites will accommodate over 5,000 women. In addition a loan will probably be made to the National Y. W. C. A., by means of which it will be enabled to accommodate 150 additional women at the site on the plaza. The bureau has under contemplation a similar loan to the Y. M. C. A. for the purpose of building dormitories to accommodate 950 men. The housing of munitions workers has also received much attention. Mr. Eidlitz said that the bureau was making investigations and would be ready to make developments in the following places: Bath, Me.; Bethlehem, Pa.; Bridgeport, Conn.; Charleston, W. Va.; Erie, Pa.; Norfolk, Va.; Portsmouth, Va.; Portsmouth, N. H.; Rock Island, Mo.; East Moline, Ill.; Davenport, Ia.; Quincy, Mass.; Watertown, N. Y.; Indianhead, Md.; New Brunswick, N. J.; New London, Conn.; Mare Island, Cal.; Philadelphia, Pa.; Puget Sound, Wash.; Niagara Falls, N. Y.; Alliance, O.; Hammond, Ind.; Sharon, Pa.; Niles, Warren, O.; Lowell, Mass.; Aberdeen, Md.; Newport, R. I. A memorandum from secretary of labor Wilson to director of industrial housing and transportation Otto M. Eidlitz announced important changes in the government's housing policy. The plan of organization approved by secretary Wilson May 4, 1918, will continue in effect until otherwise directed except

that "there shall be associated with the director a representative of the War Department, a representative of the Navy Department and a representative of the Shipping Board, who shall be known as associate directors. They shall advise the director on behalf of their respective departments or board. There shall be organized a management division, which shall undertake the management of the properties erected by the government, and also a division of existent housing, which will deal with the question of utilizing all of the housing and boarding facilities of each community in order to reduce to a minimum the need for government housing. The government will build, own, control and rent the houses until after the war. The houses erected in established communities shall be of a permanent character except where Congress has otherwise stipulated. Houses erected in communities that are not likely to continue in existence after the war shall be of a temporary character, but such temporary buildings must, of course, provide for the comfort of the occupants. Loans will only be advanced for the erection of dormitories to responsible corporations or associations not organized for profit, and then only after most careful consideration of the advantages to be gained thereby." In fixing rentals the following factors will have to be taken into account:

1. Fixed charges.
Interest on investment.
Insurance.
2. Reserves for upkeep of rented houses.
Repairs.
Renovating and redecorating.
3. Reserve for loss in case of non-occupancy.
4. Overhead expenses of administration.
5. Depreciation.

Steel Company to Build Houses.

Johnstown, Pa.—The Cambria Steel Company is to build 100 houses at once to help solve the urgent problem of housing its workers. A new residential section, an extension to Franklin borough, will be constructed on the sloping hillside just above the company's wheel plant. The steel company has appropriated \$250,000 for the construction of the houses, and more money will be available as needed. The site will accommodate between 400 and 500 houses. Clearing the land is already well under way. The Johnstown Traction Company is preparing to extend its car lines to the extreme north corner of the lot. This will give transportation to the 1,500 men who will be employed in the wheel plant, the new axle plant and No. 3 and 4 mines, and will insure direct communication with the shopping center of the city. One of the most fortunate factors connected with the operations is the excellent school facilities which precedes the erection of the houses. The Franklin borough school is modern in every respect. It is equipped with a gymnasium, swimming pool and an unusually fine teaching staff. The houses will be of tile and brick, with gray stucco exterior. They will be built in what is known as the block system of hillside architecture. Where conditions will permit some single houses will be arranged for, but on account of the topography the block system will prevail, as it is considered the most artistic, and every effort of the officials is to have these houses as modern and artistic on their external appearance as they are comfortable and sanitary on the interior. Each house will have a large porch in the front and in the rear. The sidewalks will be of cement, with a grass parking of eight feet between the sidewalks and curb. The storm water will be handled by the same sewers used for the wheel plant. This insures adequate sewerage for all storm waters. The house sewage will be taken care of independently of the storm water through the Franklin borough sewers, which are accessible for this purpose. Pure mountain water will be supplied by the Conemaugh & Franklin Water Company. The Citizens' Light, Heat & Power Company's lines pass over this plot, which insures immediate and adequate electric current for lighting or power. Each house will be equipped with a bathroom and modern plumbing throughout. The Cambria Steel Company has been careful not to overlook the much needed feature of recreation in modern communities and has ordered a site to be reserved for a children's playground.

Municipal Harbor Railroad Completed.

Baltimore, Md.—The laying of the last section of tracks for the municipal harbor railroad marks the completion of another of the important public improvements made during the present administration. The purpose has been to simplify the transportation problems of the industrial and commercial interests of the community in the matter of freight transfers from one to another of the three great trunk-line railroads serving the city. The municipal harbor railroad, in itself but three miles long, is nevertheless a connecting link for approximately 20,000 miles of trackage. It matters not on which of the great railroad systems serving the eastern and southern sections of the country, or penetrating westward, northwest and southwest, a freight consignment originates, it can now be delivered at the terminal of any of the trunk lines entering Baltimore or can be switched here for delivery at any point on any of these roads. The increased facilities for the transferring of freight from one trunk line to another for delivery at the steamship piers will be of great advantage to the city in securing a large share of the overseas commerce. In addition to Baltimore's growing importance as a great shipbuilding center it is extremely desirable that she be made a great shipping center as well.

The Municipal Railroad originates at the Spring Garden waterfront, on McComas street, runs westward along the Key Highway to Light and York streets, thence north on Light street to Pratt street, turns into Pratt and follows that thoroughfare to East Falls avenue, turns south on East Falls avenue to Aliceanna street, thence eastward to the President street station of the Pennsylvania Railroad.

By its connections with the Baltimore & Ohio, Western Maryland and Pennsylvania railroads the Municipal Railroad will serve directly as a terminal line for each of these great trunk lines and indirectly serves a like relationship to the Northern Central, Maryland and Pennsylvania, Chesapeake and Ohio, Southern, Seaboard Air Line and Atlantic Coast Line railroads.

As will be seen by reference to the accompanying map, the Northern Central Railroad and the entire system of the Pennsylvania Railroad are directly connected with the Municipal Harbor Railroad by way of Central avenue and the President street station.

The Baltimore & Ohio system is connected to the municipal line by a track running from Camden station along Wells street and north on Lawrence street, intersecting at Lawrence street and the Key Highway.

The Western Maryland Railroad is linked to the Municipal Railroad by a line from its Port Covington terminals.

Through connections with the Baltimore & Ohio and Pennsylvania railroads at Washington the southern trunk lines have direct access to Baltimore's waterfront, while the great western and northwestern roads, at their various junctions with the systems serving Baltimore, can reach this port with equal facility.

The municipal harbor railroad will be electrically operated. The city placed its order for an electric locomotive months ago, the delivery of which is long overdue. This delay has been occasioned by the demands of the government for its war needs upon the manufacturers. In



BALTIMORE'S MUNICIPAL HARBOR RAILROAD

LEGAL NOTES

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Paving Contract—Itemized—Time Limit.

(Ill.) A contract for paving held not invalid for discrepancy between specifications and bid under City and Villages Act, art. 9, § 50, which was made for material by the cubic yard without itemizing the amount of material and the cost of labor.—*McGovern v. City of Chicago*, 118 N. E. 3.

A contract for repairing paving held not invalid because not according to advertisement for bids, in that the time of execution extended beyond fiscal year for which appropriation to pay therefor was made.—*Id.*

Utility Conduit—Damages by Contractor.

(Mich.) Where illuminating and heating company had laid its conduits in public alley, contractor, excavating basement partly in alley so as to cause cave-in injuring such conduits, was liable for resulting damage.—*Edison Illuminating Co. v. Misch*, 166 N. W. 944.

(Mich.) Requirement in franchise to lighting and heating company to obtain express permit to lay its conduits in public alley, being for protection of city, might be waived by it, and failure to obtain such permit constitutes no defense in action by the company for injuries to its conduits.—*Edison Illuminating Co. v. Misch*, 166 N. W. 944.

Private Railroad—Use of Street.

(N.Y.Sup.) Though a privately owned terminal delivery railroad served only one factory, its use of the street was a public use, where it connected with all trunk lines, and issued their bills of lading; the goods being immediately put in transit.—*Stanley v. Jay St. Connecting R. R.*, 169 N. Y. 530.

Public Highways—Private Use.

(Ala.) Public highways belong to public, and there is no such thing as the rightful, private, permanent use of a public highway, and one who uses a public highway for his own private use commits indictable public offense, though he does so with permission of municipal authorities.—*City of Troy v. Watkins*, 78 So. 50.

Motor Vehicles—Street Cars.

(N.J.) Section 1 of Motor Vehicle Act of 1906 excludes from statutory definition of motor vehicles such as run only upon rails or tracks, and thereby excludes from effect of section 22 street cars of the usual type.—*Kolankiewicz v. Burke*, 103 A. 249.

Use of Street—Pedestrian.

(Wash.) A pedestrian has the same right to use the street as a vehicle especially at or near crossings, though he cannot obstruct traffic.—*Locke v. Greene*, 171 P. 245.

Pedestrian Crossing Street—Contributory Negligence.

(Kan.) Pedestrian attempting to cross at a street intersection is not necessarily guilty of contributory negligence, because he does not look behind him for approaching automobiles.—*Cusick v. Miller*, 171 P. 599.

the meanwhile the railroads will be permitted to use their steam power for transfers, such shifting to be done at night when the streets in this section of the city are ordinarily clear of vehicular traffic. The municipal railroad will be self-supporting, the city deriving sufficient revenue from its charges for services rendered to cover operating and maintenance costs. Supervision of the line will be provided for through the department of highways' engineer, R. M. Cooksey.

NEWS OF THE SOCIETIES

CALENDAR OF MEETINGS.

July 10-12.—OHIO ELECTRIC LIGHT ASSOCIATION. Twenty-fourth annual convention, Breakers Hotel, Cedar Point, O. Secretary, D. L. Gaskill, Greenville, O.

Aug. 27-29.—LEAGUE OF CITIES OF THIRD CLASS IN PENNSYLVANIA. Nineteenth annual meeting, Erie, Pa. Secretary, Fred H. Gates, city clerk, Wilkes-Barre, Pa.

Sept. 24-27.—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention, Atlanta, Ga. Secretary, Clarence R. George, Houston, Tex.

Oct. 2-4.—AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS. Annual meeting, Buffalo, N. Y. Secretary, Charles Carroll Brown, 304 E. Walnut St., Bloomington, Ill.

Missouri Association of Public Utilities.

The Missouri Association of Public Utilities held its twelfth annual convention at St. Joseph, Mo., recently and more than a hundred central-station operators and their representatives were present. The problems growing out of the excessive costs of operating and the difficulty of obtaining an increase of rates whereby to meet increased expenses formed the basis of various papers and much discussion.

In the absence of Bruce Cameron, president of the association, the convention was called to order by Hugo Wurdack, St. Louis, former president, who made a brief address, closing by introducing Dr. J. C. Whitsell, mayor of St. Joseph. A response to the mayor's address of welcome was given by Henry W. Kiel, mayor of St. Louis.

The annual address of President Cameron was read by the secretary, J. S. Tritle, district manager of Westinghouse Electric & Manufacturing Company, presented a paper on "How the Manufacturer Is Meeting the Problems That Have Been Created by War Conditions." This was followed by a paper on "Taxes Affecting Public Utilities," by H. Spoehrer, secretary-treasurer of the Union Electric Light & Power Company, St. Louis. Lieutenant-Governor Crossley, head of the fuel administration of Missouri, addressed the convention. He outlined some of the difficulties met last winter in making distribution of fuel as equitable as possible. His interesting address closed with a patriotic appeal. The fuel question received attention in the discussion that followed. Colonel P. J. Kealy, president of the Kansas City Railways Company, read a paper on "The National Movement for Increased Revenue." The closing paper was by H. Wurdack, chairman of the rates and revenue committee, on "The Effect of War Upon Public Utilities in State and Nation."

The officers elected are as follows: President, J. H. Van Brunt, St. Joseph Railway, Light, Heat & Power Company; first vice-president, J. M. Scott,

Kansas City Gas Company; second vice-president, L. P. Andrews, Sedalia Water Company; third vice-president, H. Spoehrer, Union Electric Light & Power Company, St. Louis; secretary-treasurer, F. D. Beardslee, Union Electric Light & Power Company, St. Louis; executive committee: L. H. Egan, assistant general manager, Union Electric Light & Power Company, St. Louis; J. E. McLeod, comptroller, Laclede Gas Light Company, St. Louis; Colonel P. J. Kealy, president, Kansas City Railways Company; B. C. Adams, Empire District Electric Company, Joplin, Mo.; public affairs committee: I. R. Kelso, chairman, Light & Development Company, St. Louis, Mo.; E. D. Bell, Illinois Traction System, St. Louis, Mo.; J. R. Woodfill, Lawrence County Water, Light & C. S. Company, Aurora; C. L. Proctor, Empire District Electric Company, Joplin, Mo.; V. L. Elbert, St. Joseph Gas Company; J. F. Porter, Kansas City; Bruce Cameron, United Railways Company, St. Louis; E. C. Deal, Springfield Gas & Electric Company.

The consensus of opinion at the convention was summed up in the following resolutions:

1. That it is the sense of this Association that all public utilities are entitled to increases in rates sufficient at least to cover the increased costs, since the Public Service Act took effect, of money, materials and labor essential to producing the service; and that new or changed schedules of rates filed pursuant to said Act designed to that end, should be allowed to take effect by operation of law and should not be suspended by the commission and should continue in force unless after full hearing and a sufficient adverse showing is made to justify the modification of such new schedule.

2. That all operating costs incurred by franchise requirements, rules and regulations, not essential to maintenance of service, should be discontinued so far as possible for the duration of the war.

3. That all capital expenditures heretofore required by franchises, commission orders, rules and regulations or otherwise for plant extensions and betterments for new business should be discontinued so far as possible for the duration of the war, as such expenditures at this time become a permanent capital charge based on present abnormal costs and will be reflected in abnormally high service rates throughout the future.

4. That this association appoint a committee of five to present these resolutions to the Public Service Commission, and that said committee urge upon the Commission the importance of adopting some plan which will afford speedy and adequate relief to the utilities of this state along the lines set forth in these resolutions.

American Automobile Association.

Because of the enormous increase of motor truck transportation and passenger car travel on account of war conditions, directors of the American Automobile Association at the Traymore Hotel, at Atlantic City, voted to urge Congress to pass as a war measure a federal uniform traffic law to harmonize regulations of the states with reference to weight of loads, registration of vehicles and operators and speed limitations. A measure covering all these points is

now being drafted for introduction soon.

George C. Diehl of Buffalo predicted that virtually universal demand for the federalization of the highway system of the nation in much the same way that the railroads have been brought under governmental control and regulation is inevitable because the present haphazard system is breaking down under war-time pressure.

David Jameson of New Castle, Pa., was elected president of the national automobile organization, which has more than 200,000 members and clubs in all states. The other officers are: Vice-presidents, Ralph W. Smith, Denver; P. J. Walker, San Francisco; H. J. Clark, Minneapolis; Preston Belvin, Richmond; Dr. John H. Quayle, Cleveland; Dr. R. R. Elmore, Louisville, and Clifford Ireland, Peoria, Ill.; secretary, John N. Brooke, Torrington, Conn., and treasurer, H. A. Bonnell, Newark, N. J.

Eight million dollars' worth of automobiles are stolen every year in 125 cities, according to W. S. Gilbreath of Detroit, who urged a nation-wide campaign for more severe punishment for motor thieves.

Two hundred thousand motorists are to be enlisted in a campaign for highway improvement work as a step in promoting auto truck lines throughout the country to tap farming sections, saving millions of dollars' worth of perishable food products, serving as a feeder for the railroads and also relieving them of the duty of moving a large part of the freight which formerly had to be moved either by rail or water.

PERSONALS

Batchelder, B. F., director of public works at Ravenna, O., and in charge of the construction of the water filtration work there, has resigned his position to become associated with the engineering staff of Clyde Potts, consulting engineer, New York City.

Field, Arthur M., city manager of Winchester, Va., has been given leave of absence for the period of the war and will be connected with the Government Bureau of Industrial Housing in the engineering department in Washington. Thomas J. Trier, assistant city manager, will assume the duties of city manager.

House, Garrett O., general superintendent of the bureau of water, St. Paul, for the past six years, has resigned to become superintendent of the St. Paul City Railway.

Phinney, Sedley H., has been elected secretary of the Bureau of Municipal Research of Philadelphia. He is a civil engineer with degrees from the Universities of Rochester and Wisconsin. Mr. Phinney succeeds Robert E. Tracy, who some months ago was called to the directorship of the new research bureau in Indianapolis.

INDUSTRIAL NEWS

Cast Iron Pipe.—Government prices include new freight rates following the recent increase. Quotations: Chicago: 4-inch, \$65.05; 6-inch and larger, \$62.05; Class A \$1 extra. Birmingham: 4-inch, \$58; 6-inch and larger, \$55; Class A \$1 extra. New York: 4-inch, \$64.75; 6-inch and larger, \$61.75; Class A \$1 extra.

Fuel Supply for Pleasure Auto Production Cut.

Fuel Administrator Garfield has announced that while the general question of curtailing this industry is now in the hands of the Steel Section of the War Industries Board, he feels, however, responsible to limit the amount of fuel used in the manufacture of pleasure automobiles to whatever extent the national situation demands. He made it plain even if steel is available for a larger production he will be compelled to limit the fuel for the manufacture of pleasure automobiles in the season 1918-19 to not over 25 per cent of that consumed for this purpose in the season 1917-18. This curtailment does not affect the manufacture of trucks or other cars for war use nor the enormous amount of other war material which the automobile companies have already undertaken for the Government.

Iron Ore and Steel Products.

An increase of 45 cents a gross ton in the price of iron ore to meet wage and freight rate advances has been agreed upon by the War Industries Board, iron ore producers, and representatives of the American Iron and Steel Institute. The new price became effective July 1, following approval by President Wilson. New developments in cast iron and steel prices are awaited. Chairman Robert S. Brookings, of the Price-Fixing Committee of the War Industries Board said that the steel men had asked for no increase over the present prices, which expire June 30, and will be continued. The present price for iron ore is \$5.05 a gross ton, free on board, lower lake ports, and the 45 cents increase is based on that figure. It is understood that the chief factors discussed at the conference were stimulation of ore production, necessity for meeting increased freight rates and the labor situation. John A. Savage, president of J. A. Savage & Co., represented the ore producers, and Elbert H. Gary, president of the United States Steel Corporation, headed the Institute's Committee. Director of Steel J. L. Replogle acted as chief adviser to the Price-Fixing Committee.

The general testimony of producers is that the new system of control of deliveries is working quite well. There are a few uncertainties remaining, but these are being removed rapidly. There is the closest co-operation between the producers and the various instrumentalities at Washington. On the whole

the prescribed "schedule of purposes entitled to preference treatment" in the distribution of pig iron and steel products is being interpreted with little difficulty. One thing in the system that is advantageous to the producers is that it relieves them of responsibility to customers whose purposes are not given official sanction. There is a measure of elasticity in the arrangement, moreover, for if there is doubt as to preference in delivery the buyer can take the case to Washington and solicit a priority order. Outside of the lines of consumption that are directly connected with prosecuting the war the important items in the preference list are the purposes connected with fuel and food. Building operations not connected with the war are apparently excluded.

The Lakewood Engineering Company's sales force held a very enthusiastic and successful meeting at the main plant in Cleveland the first week in June. Sales representatives from all over the United States gathered together and discussed with the sales, production, purchasing and engineering executives the present day problem of serving the construction and industrial fields. Over one hundred attended the daily sessions. Lakewood products include cars, track, clam shells, mixers, chutes, locomotives, etc., for construction and road work and electric tractors, electric trucks, factory trucks, electric locomotives, track, clam shell buckets for the industrial field, including railroads, steel plants, clay plants, quarries, coal mines, fertilizer plants, etc.

Survey of All Industries.

An immediate survey of every part of the United States is to be made, in order to find out which industries not now doing war work may be utilized for that purpose, also which industries already engaged on work for the Government are able to take on additional contracts or increase their production of munitions and war supplies. To do this the War Industries Board has established a Resources and Conversion Section, with Charles A. Otis, former President of the Cleveland Chamber of Commerce and a member of the Board of Directors of the Chamber of Commerce of the United States, as chief.

The country has been divided into twenty regional groups, each of which will be organized through its commercial associations. One organization in each region has been selected to take the initiative in bringing about a definite organization. The commercial body chosen to do this preliminary work will communicate with every other business association in its region and with the industries not represented in such association, and arrange for a general meeting at which plans for organization will be perfected. When that is done it is expected that one man will be named in each

region to act as the direct representative of Mr. Otis in handling business between the region and the Resources and Conversion Section.

Every type of industry, whether represented in commercial organizations or not, will be asked to co-operate. The regional system is intended to supplement the work of the National War Service Committees of the industries, some of which are already effectively co-operating with the Government, while others are in process of formation. Many industries are not so organized as to permit representation by a National War Service Committee.

By the regional system it is proposed to look after the requirements of these scattered industries and provide a means by which greater impetus can be given to increasing production in every part of the country. It is believed that this will result in great measure in preventing further dislocation of labor, new housing programs, unnecessary expansion of plants, and freight congestion. It will be an object also to provide work for industries whose normal output is being reduced without their resources being employed in new directions.

Walter A. Zelnicker Supply Co., St. Louis, Mo., has issued for general distribution the new Bulletin No. 237, which lists a very interesting collection of equipment for immediate delivery at attractive prices. The list includes rails, locomotives, cars, cranes, steam shovels, steel piling, tanks, hoists, air compressors, boilers, engines, motors, generators and all kinds of contractors equipment.

"The Avenue of Sublime Peace."

The Barrett Company has issued a very interesting booklet entitled, "The Avenue of Sublime Peace." It is by William F. Mannix, editor of "The Memoirs of Li Hung Chang" and describes in narrative form an interview with President Li Yuan Hung of China, who is himself an engineer, on the question of good roads in that country in general and its first modern highway in particular. The President designed and supervised the building of this road in "The Forbidden City," known as "The Avenue of Sublime Peace," and it is surfaced with Tarvia. This road marks the beginning of a system for this country of bad roads—bad in spite of one of the "Ten Charities" of the Buddhists which says: "He who makes a piece of good road cuts off one thousand dots on the debtor side of his record with Buddha." The work was begun in spite of ancient traditions which forbade, under the penalty of banishment or death, the introduction of any foreign article within imperial grounds. Tarvia roads have been built all the way from Waseda University in Japan to Melbourne, Australia and Honolulu. The booklet is illustrated by views of these beautiful roads.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

CONTRACTS AWARDED ITEMIZED PRICES

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Tex., Liberty	.....July	8..	Constructing a number of roads to cost about \$115,000.	N. Smith, Co. Judge.
Minn., Chaska	.....2 p.m., July	8..	Road surfacing 26.5 miles, including graveling.....	State Hwy. Comm., St. Paul, Minn.
N. D., Bowman	.....2 p.m., July	8..	17.7 miles road construction, including 20,520 cu. yds. turnpiking, 34,282 cu. yds. excavation, etc.....	State Hwy. Com., Bismarck, N. D.
N. Y., New York	.....2 p.m., July	8..	Regulating and repaving with granite block on concrete foundation; also with sheet asphalt.....	Frank L. Dowling, Boro. Pres. Manhattan.
Wash., Okanogan	.....July	8..	Grading, draining and surfacing.....	H. E. Smith, Co. Engr.
Pa., West View	.....8 p.m., July	9..	2,600 ft. cement sidewalks.....	C. A. McClain, Boro. Clk.
N. C., Waynesville	.....11 a.m., July	8..	Constructing about 6 miles of road, work involving 11,995 yds. of earth, 2,101 yds. rock and 79,773 sq. yd. gravel surfacing.....	State Hwy. Com., Raleigh, N. C.
Minn., Buffalo	.....2 p.m., July	8..	Grading four roads and graveling four roads.....	State Hwy. Dept., St. Paul, Minn.
N. D., Bowman	.....July	8..	17.7 miles of road, work including 20,520 cu. yds. excavation.....	F. R. Huff, Co. Aud.
Minn., St. Paul	.....10:30 a.m., July	8..	Grading and improving street.....	H. W. Austin, Pch. Agt.
Minn., Caledonia	.....noon, July	8..	Road construction.....	State Hwy. Com., Guardian Life Bldg., St. Paul.
N. Y., Bethlehem	.....2 p.m., July	8..	Constructing concrete highway, 1,802 ft. long and 20 ft. wide.....	S. W. Conning, Town Clk., Slingerlands, N. Y.
Pa., West View	.....8 p.m., July	9..	Constructing sidewalks on a number of streets.....	C. A. McClain, Boro. Clk.
Ind., South Bend	.....10 a.m., July	9..	Grading street.....	Bd. of Pub. Wks.
Tex., Sharon	.....July	9..	7,225 sq. yds. pavement on a 6-in. concrete foundation.....	City Clerk
Tex., Cooper	.....1 p.m., July	10..	Paving about 15,000 sq. yds.; 3,600 ft. curb and gutter.....	Henry E. Elrod, Engr., 505 Interurban Bldg., Dallas, Tex.
N. J., Trenton	.....10:30 a.m., July	10..	37,000 sq. yds. portland cement concrete road surfacing.....	State Highway Commission.
N. D., Jamestown	.....2 p.m., July	10..	9.16 miles road construction, including 16,550 cu. yds. turnpiking, 27,965 cu. yds. excavation, etc.....	State Hwy. Com., Bismarck, N. D.
N. D., Fessenden	.....2 p.m., July	11..	18 miles road construction, including 29,862 cu. yds. turnpiking, 27,799 cu. yds. excavation, etc.....	State Hwy. Com., Bismarck, N. D.
Pa., Harrisburg	.....10 a.m., July	11..	Improving with one-course plain concrete, vitrified block on concrete base, bituminous concrete, Hillside vitrified block on concrete foundation.....	J. D. O'Neil, State Highway Commr.
Pa., Harrisburg	.....10 a.m., July	11..	Reconstructing nine state highways in eight counties, involving 32,199 ft. plain concrete, 4,983 ft. vitrified block or plain concrete; 2,334 ft. plain concrete or bituminous concrete and Hillside vitrified block, 1,842 ft. vitrified block, 15,918 ft. plain concrete or bituminous concrete or concrete foundation, 18,083 ft. plain concrete and Hillside vitrified block, 3,319 ft. grading and draining.....	J. Denny O'Neil, St. Hwy. Commr.
N. J., Newark	.....11:30 a.m., July	11..	Paving two streets with creosoted wood block on 6-in. concrete base, blue-stone curbing, etc.....	M. R. Sherrerd, Chief Engr.
Mont., White Sulphur Springs	.....July	12..	Clearing, grading and bridging 5 miles of road.....	L. I. Hewes, Dist. Engr., Office of Pub. Rds., Portland, Ore.
Mont., Libby	.....July	12..	Clearing and grading 10.1 miles.....	L. I. Hewes, Dist. Engr., Office of Pub. Roads, Portland, Ore.
N. J., Beverly	.....July	12..	Concrete curbs and gutters in Edgewater Park.....	J. J. Logan, Engr., Mt. Holly, N. J.
N. D., Rugby	.....noon, July	12..	5 miles road construction, 3 1/2 miles with sand-clay surface, including 8,436 cu. yds. turnpiking, 11,293 cu. yds. earth excavation, etc.....	State Hwy. Com., Bismarck, N. D.
O., Avon Lake	.....noon, July	13..	Macadamizing road.....	W. R. Hinz, Vil. Clk.
Ind., Lebanon	.....10 a.m., July	13..	Constructing gravel road.....	Cleve Goodwin, Co. Aud.
Kan., Kansas City	.....noon, July	15..	Resurfacing with water bound macadam 18,400 ft. boulevard, 16 ft. wide.....	Co. Clk.
Kan., Kansas City	.....July	15..	Constructing 1.6 miles waterbound macadam.....	O. K. Williamson, Co. Engr.
N. M., Santa Fe	.....Aug.	15..	Constructing 3 miles of road.....	State Hwy. Com.
S. D., Deadwood	.....July	15..	Grading earth road and relocating 16.6 miles old road; corrugated pipe, culverts, etc.....	J. A. Whitaker, Engr., 301 Tramway Bldg., Denver, Col.
Ill., Joliet	.....July	15..	Brick pavement.....	Phil. Pick, City Clk.
Del., Wilmington	.....11 a.m., July	16..	Grading, excavating, constructing concrete foundation; laying sheet asphalt with vitrified block gutters and vitrified blocks between rails and for three courses outside rails, or asphalt block from curb to curb; about 20,000 sq. yds.....	Frank W. Pierson, Sec. St. and Sewer Dept.
Pa., Harrisburg	.....10 a.m., July	19..	Reconstructing 19,318 linear feet plain cement concrete and Hillside vitrified block, 16 ft. wide, in Washington county.....	J. Denny O'Neil, State Hwy. Commr.
O., Hamilton	.....10 a.m., July	29..	Constructing ditches, reshaping, filling roadway and graveling.....	County Surveyor.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
SEWERAGE.				
Minn., Marshall	July	6..	Constructing ditches, involving 6 to 30-inch tile.....	E. S. Shepard, Co. Aud.
O., Chillicothe	noon, July	6..	Constructing floor systems on a number of bridges.....	W. S. Barrett, Co. Aud.
Neb., Neligh	noon, July	8..	Constructing steel, concrete and wooden bridges; repair work	P. H. Peterson, Co. Clk.
O., Wooster	July	8..	Constructing reinforced concrete bridge.....	Phil Markley, Co. Engr.
Ont., Windsor	noon, July	8..	Furnishing and testing three motor-driven pumping units, one with 500 Imperial gallons capacity per minute and two with 1,000 gallons.....	Morris Knowles, 8 Royal Bank Building.
Ia., Montezuma	2:30 p.m., July	8..	Constructing outlet sewer, 1,425 ft. 15-in. vitrified sewer pipe, part of pipe from taking up existing line; sewage treatment plant consisting of cylindrical Imhoff tank, 20-ft. diameter and 20 ft. deep, hollow tile superstructure, concrete dosing chamber, 26x32 1/2 ft., four alternating siphons; three sand filter beds, 60x150 ft., sludge bed, 30x40 ft.....	John H. Dunlap, Cons. Engr., Iowa City, Ia.
Utah, Salt Lake City	10 a.m., July	9..	Constructing sewer extension.....	Gordon Snow, City Rec.
Conn., Bridgeport	July	10..	Constructing sewage treatment plant.....	W. Chew, Chairman, Paving & Sewer Commission.
Mich., Dearborn	July	10..	Constructing sewerage system, involving 66,000 ft. 8 to 24-inch pipe, sewage treatment plant and pumping stations	C. W. Hubbell, Penobscot Bldg., Detroit, Mich.
Ill., Winchester	July	15..	Constructing drainage system and levee.....	W. L. Bagshaw, Commr.
Wis., Rhinelander	3 p.m., July	17..	Constructing about 2,628 ft. sanitary and storm sewer with appurtenances	John D. Gilligan, City Clk.
D. C., Washington	2 p.m., July	18..	Constructing sewer system at Toadlene School under jurisdiction of San Juan school, Shiprock, N. Mex.....	Dept. of Interior, Office of Indian Affairs.
O., North Canton	July	20..	Constructing storm and sanitary sewers, involving 8 to 24-inch vitrified tile.....	Guiley & Rice, Engrs., Daily News Bldg., Canton, O.
D. C., Washington	10 a.m., July	31..	Five concrete bridges for city in West Indies (refer to file No. 100222).....	Bureau of Foreign and Domestic Commerce, Dept. of Commerce, Wash., D. C.
WATER SUPPLY.				
Ont., Kitchener	July	8..	Taking down steel standpipe and sale of material in standpipe	H. Hymmen, Supt. Water Works.
Conn., Hartford	noon, July	10..	Constructing 4,800 ft. 48-in. reinforced concrete pressure conduit, built either in place or precast.....	C. M. Saville, 1026 Main St.
Utah, Spanish Fork	July	10..	700,000-gallon reinforced concrete reservoir.....	D. E. Roberson, City Rec.
Mich., Ann Arbor	2 p.m., July	11..	Laying 18,000 ft. 20-inch cast iron water main with valves and special castings.....	Geo. S. Vandawarker, Mgr., Waterworks Dept.
Mont., Livingston	July	16..	Constructing 1,000,000-gallon concrete reservoir.....	C. T. Sacket, City Engr.
D. C., Washington	2 p.m., July	18..	Constructing water supply and distribution system at Toadlene School under jurisdiction of San Juan school, Shiprock, N. Mex.....	Dept. of Interior, Office of Indian Affairs.
O., North Canton	July	20..	1,185 ft. 6-in. cast iron water main.....	Guiley & Rice, Engrs., Daily News Bldg., Canton, O.
FIRE EQUIPMENT.				
Mich., Detroit	2 p.m., July	8..	Furnishing five 6-cylinder, 750-gallon combination pumping engine and hose cars equipped with satisfactory hydrant thawing device; one 6-cylinder, four-wheel tractor-drawn, 85-ft. aerial ladder truck fully equipped with ladders; two 6-cylinder city service trucks equipped with ladders, net and chemical tank.....	Geo. J. Finn, Sec. Fire Com.
N. J., Jersey City	2 p.m., July	9..	Three triple combination pumping motor fire engines.....	Daniel O'Regan, Acting City Clk.
Kan., Winfield	July	15..	Motor combination pump and hose car, 500 gallons minimum capacity.....	W. C. Hall, City Clk.
BRIDGES.				
Cal., San Jose	11 a.m., July	8..	Constructing five reinforced concrete bridges.....	Henry A. Pfister, Co. Clk.
N. D., Bowman	2 p.m., July	8..	Reinforced concrete box culverts.....	State Hwy. Com., Bismarck, N. D.
Ind., Connersville	2 p.m., July	8..	Reinforced concrete bridge; concrete culvert; repairing bridge	Glen Zell, Co. Aud.
Ala., Opelika	July	8..	Constructing 60-ft. concrete bridge.....	W. S. Keller, St. Hwy. Engr., Montgomery, Ala.
N. D., Dickinson	2 p.m., July	8..	32-ft. span bridge.....	State Hwy. Com., Bismarck.
N. D., Belfield	2 p.m., July	8..	Bridge with 32-ft. span and concrete abutments.....	J. W. Bliss, Chief State Engr., Bismarck, N. D.
Neb., Ainsworth	noon, July	9..	Constructing two bridges.....	R. M. Herre, Co. Clk.
N. D., Jamestown	2 p.m., July	10..	Reinforced concrete arch culverts.....	State Hwy. Com., Bismarck, N. D.
W. Va., Middlebourne	July	10..	Constructing 55-ft. reinforced concrete arch bridge; 60-ft. reinforced concrete arch bridge, and reinforced concrete arch bridge with two 65-ft. spans.....	J. E. Smith, Co. Clk.
O., Cleveland	July	11..	Constructing two bridges.....	William A. Stinchcomb, Co. Surv.
N. D., Fessenden	2 p.m., July	11..	Relaying old pipe culverts and constructing reinforced concrete arch culverts	State Hwy. Com., Bismarck, N. D.
N. D., Rugby	2 p.m., July	12..	Constructing culverts, including reinforced concrete headwalls for 60-inch circular corrugated metal culverts....	State Hwy. Com., Bismarck, N. D.
Mont., Libby	July	12..	Constructing 16 log bridges.....	L. I. Hewes, Dist. Engr., Office of Pub. Roads, Portland, Ore.
Kan., St. John	noon, July	15..	Constructing two bridges, each with two 20-ft. reinforced concrete spans, 18-ft. roadway.....	Co. Clk.
O., Georgetown	noon, July	17..	Constructing bridges, culverts and abutments.....	C. Thomas, Co. Engr.
W. Va., Clarksburg	July	24..	Constructing 9 concrete bridges.....	J. R. Wilson, Co. Engr.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
MISCELLANEOUS.				
O., Dayton	July 6..	Furnishing 400,000 concrete blocks, 2x1x5 ft. for flexible slab revetment in flood protection work.....	E. Kuhns, Sect. Miami Conservancy Dist.
D. C., Washington	10:30 a.m., July 8..	Panama Canal supplies, including copper tubing, asbestos packing, magnesia pipe covering, garbage cans, leather belting, metallic steam hose, coal tar, etc.....	Gen. Pch. Officer, Panama Canal, Washington, D. C.	
Ill., Rockford	July 9..	Constructing ditch, involving 20,394 ft. 8 to 30-inch tile..	T. Johnson, Co. Clk.
N. S., Inverness	July 9..	Constructing harbor improvements.....	District Engr., North Sydney, N. S.
Mo., Memphis	3 p.m., July 10..	12 miles of drainage ditch, involving 556,700 cu. yds.....	C. J. Wiegner, Engr.
Man., Ninette	noon, July 10..	Constructing stop log dam, pile bridges and canal for river diversion	R. C. Desrochers, Sec. Dept. of Pub. Wks., Ottawa, Can.
N. Y., So. Hampton	11 a.m., July 10..	Replacing or reconstructing tide gates on canal.....	James A. Early, Town Clk.
Wis., Milwaukee	10:30 a.m., July 10..	Constructing concrete rail.....	Percy Braman, Com. of Pub. Wks.
Md., Baltimore	July 15..	Furnishing and placing riprap stone at light stations....	Lighthouse Inspector.
Tex., Clint	July 16..	Constructing irrigation canals.....	U. S. Reclamation Serv., El Paso, Tex.
Pa., Philadelphia	July 19..	Dredging in river.....	U. S. Engr. Office.
Pa., Philadelphia	noon, July 20..	Timber bulkhead repairs.....	George S. Webster, Dir. Dept. of Wharves, Docks and Ferries.

ROADS AND STREETS

Anniston, Ala.—Appropriation of an amount not exceeding \$6,000 by the county commissioners' court will be met with an additional expenditure of \$60,000 by the Government on the new roadway between Anniston and Camp McClellan. This announcement is authorized by Capt. R. E. Smoot, construction quartermaster at Camp McClellan. The change in the roadbed to avoid the dangerous curves near Edgemont cemetery and the grading of a new bed between the cemetery and the junction of the old and new roads above the base hospital road has caused an unexpected expenditure and the amounts appropriated by the county and the Government is insufficient to complete the road.

Pocatello, Ida.—City council has approved an ordinance for the improvement of district No. 12, also for the issue of improvement bonds for the above district.

Chicago, Ill.—Contracts shortly let by city, building streets and alleys as follows: Alley between Bryn Mawr, Catalpa, Broadway and Magnolia Sts., involving 1,288 ft. concrete curb, 385 cu. yd. grading, 1,000 sq. yd. vitrified brick pavement on 6-in. cement base; cost, \$3,865. Alley between Darwin, Edgewood, Albany and Kedzie Sts., 100 cu. yd. grading, 250 sq. yd. 7-in. concrete pavement, \$725. Alley between Diversey, Schubert, Mozart and Francisco Sts., 280 cu. yd. grading, 986 sq. yd. 7-in. concrete pavement, 260 ft. 10-in. sewer tile, 1 catch basin, 1 manhole, \$3,153. Alley between Van Buren, Congress, Hamlin and Springfield Sts., 389 cu. yd. grading, 1,190 sq. yd. 7-in. concrete pavement, \$2,620. Alley between Harrison, Flournoy, Leavitt and Hoyne Sts., 210 cu. yd. grading, 1,040 sq. yd. 7-in. concrete pavement, \$2,343. Alley between Pierce, Le Moyne, Spaulding and Homan Sts., 1,201 ft. concrete curb, 350 cu. yd. grading, 935 sq. yd. vitrified brick pavement on 6-in. concrete base, \$3,281. Alley between Carroll, Fulton, Elizabeth and Ada Sts., 903 ft. concrete curb, 400 cu. yd. grading, 803 sq. yd. vitrified brick pavement on 6-in. concrete base, \$3,154. Alley between Maxwell and Liberty Sts. from Union Ave. to point east, 400 ft. concrete curb, 100 cu. yd. grading, 200 sq. yd. vitrified brick pavement on 6-in. concrete base, \$800. Alley west of Jefferson St. from Maxwell to Liberty Sts., 360 ft. concrete curb, 80 cu. yd. grading, 160 sq. yd. vitrified brick pavement on 6-in. concrete base, \$6,650. Alley between Arthington, Taylor, Francisco and Sacramento Sts., 266 cu. yd. grading, 1,040 sq. yd. 7-in. concrete pavement, \$2,450. Alley between Fillmore, Grenshaw, Spaulding and Homan St., 338 cu. yd. grading, 1,220 sq. yd. 7-in. concrete pavement, \$2,900. Alley between Flournoy, Lexington, Sacramento and Albany Sts., 274 cu. yd. 7-in. concrete

pavement, \$2,205. Alley between Polk and Springfield St., 280 cu. yd. grading, 800 sq. yd. 7-in. concrete pavement, \$1,800. Alley between Fillmore, 12th, Whipple and Albany Sts., 282 cu. yd. grading, 1,220 sq. yd. 7-in. concrete pavement, \$2,600. Alley between Fillmore, 12th, Albany and Troy Sts., 638 cu. yd. grading, 1,220 sq. yd. 7-in. concrete pavement, \$3,200. Alley between Fillmore, Grenshaw, Crawford and Springfield Sts., 125 cu. yd. grading, 1,250 sq. yd. 7-in. concrete pavement, \$2,375. South Hermitage Ave., from West 47th to West 51st St., 4,920 ft. concrete curb and gutter, 2,700 cu. yd. grading, 10,060 sq. yd. asphalt pavement on 6-in. concrete base, 12 catch basins, \$30,124. Kingston Ave., from East 79th St. to Baltimore & Ohio R. R. right of way, 1,870 ft. concrete curb and gutter, 2,200 cu. yd. filling, 2,980 sq. yd. asphalt pavement on 6-in. concrete base, 2 catch basins, \$10,789. Thomas St., from West Grand Ave. to Chicago & Northwestern R. R. right of way, 14,000 ft. concrete curb and gutter, 11,000 cu. yd. grading, 800 ft. 10-in. sewer tile, 51 catch basins, 10 manholes, 21,600 sq. yd. asphalt pavement on 6-in. concrete, \$73,553. Total cost, \$154,587. C. E. Hill, 207 City Hall, city engineer.

Davenport, Ia.—Council decides to permanently improve Brady St., from Front St. north to the railroad tracks and east in front of the Bazaar block; Columbus Ave., from Prospect lane to Eddy St.; Eddy St., from Mississippi Ave. to Spring St.; Judson St., from Fulton Ave. to Eddy St.; alley between Esplanade and Mississippi Aves., north of Fulton St.

Davenport, Ia.—The board of public works was directed to prepare resolutions for the paving of several streets.

Dubuque, Ia.—County board of supervisors will at next session advertise for bids to complete a five-mile stretch of road between Center Grove and Centralia.

Dubuque, Ia.—City council and beach committee have decided to open the street at end of the car line and north of the pumping station to make a safe entrance to the beach. This will give the street over 60 feet in width.

Frankfort, Ky.—Council passed resolution to oil certain streets proposed by Mayor Rosson.

Colfax, La.—Citizens and directors of the Jefferson highway at a meeting here discussed ways and means to forward work and complete the highway through Grant parish. Among the propositions discussed was the division of a \$150,000 bond issue into two offerings, one offering of \$75,000 to be made at once, and another of \$75,000 to be made five or six months later. The division is to be made in order to reduce the offering below \$100,000 and thus avoid opposition of the bond issue by the government. Committees were appointed to look into the feasibility of dividing the bond issue into two offerings and have investigation made as to the legality of two or three questions that have arisen.

Baltimore, Md.—City preparing plans granolithic sidewalks around city prop-

erty. Engr., R. M. Cooksey, City Hall. Jas. E. Preston, mayor, City Hall.

Manistee, Mich.—The city manager was authorized to repair the north approach to the Smith St. bridge with asphalt and planking at an estimated cost of \$450.

Muskegon, Mich.—City will hold a special election July 16 to consider a bond issue of \$110,000 for a creosote pavement on Boblake and Ottawa Sts. The Markle Cement Co. asking \$100,940 for the two jobs, will be given the contract if the project is approved.

St. Louis, Mo.—Aldermanic public utilities committee has approved a bill authorizing the construction of a driveway to cost \$75,000 through the Glasgow tract, near the Chain of Rocks, in consideration of the transfer of 40 acres of land on the hillside to the city as a site for a park.

Clifton City, N. J.—Ordinances to establish the grade of Central Ave., between Klaverack road and Klater St.; Colfax Ave., between Klaverack road and Klater St., and Jackson St., between Colfax Ave. and Clifton boulevard, passed first and second readings. Mayor Schmidt.

Clifton City, N. J.—A resolution authorizing the clerk to give public notice of the intention to grade, curb and gutter 3d St., between Washington and Clifton Aves., was adopted. The engineer was ordered to draw up an ordinance to improve Washington Ave., between 3d and 4th sts. Mayor Schmidt.

Hoboken, N. J.—For repairing 4th, 7th and 14th Sts. city having plans prepared. J. D. Whittemore, city engineer.

Newark, N. J.—City sold an issue \$823,000 street opening 5 per cent. bonds to a syndicate composed of Kean, Taylor & Co., Rhoades & Co., and Hemphill, White & Chamberlain for \$103,778.

Red Bank, N. J.—State highway commission, Broad St. Bank bldg., care A. L. Gover, chief clerk, Trenton, will shortly ask bids road paving, Red Bank to Middletown, N. J., route No. 13. Engr., W. G. Thompson, Broad St. Bank bldg., Trenton, N. J.

Niagara Falls, N. Y.—City council has recommended the purchase for park purposes of portion bounded by Main St., Maple Ave., Roselle Ave. and McKoon Ave., excepting portion now owned by the city and occupied by the school building and grounds of the Maple Ave. school, and lots Nos. 12, 13, 14, 15 and 16 on the south side of Roselle Ave., and lots Nos. 17, 18 and 19 on the west side of McKoon Ave. The estimated cost is \$13,500.

Dayton, O.—Improvement resolutions were enacted providing for the paving of Iroquois Ave., from Melrose to the Y. M. C. A. athletic park and the paving of the alley north of Herman Ave.

Dayton, O.—Ordinances were enacted for the establishment of the grade of Aberidan Ave. from Garland to Harbine.

Warren, O.—Road improvement bonds to the amount of \$30,000 have been sold. M. H. Evans, clerk.

Miami, Okla.—Plans are in consideration for the paving of several streets. R. Q. James, clerk.

Pauls Valley, Okla.—Taxpayers of Carvin county voted \$185,000 for constructing several roads.

Canyon City, Ore.—Grant county will grade, drain and macadamize about five miles of road between John Day and Prairie.

Johnstown, Pa.—See "Sewerage."

Philadelphia, Pa.—Plans for the improvement of Frankford Ave., between Linden Ave. and City Line, so that it will be especially adapted to heavy auto truck traffic incident to the building of ships at Bristol, have almost been completed by the department of public works, and in a few days bids will be asked of contractors. The plans provide for a solid concrete construction of sections of the street where there is a grade. On other sections the construction will be of asphalt with a concrete base. The purpose of having a solid concrete construction is to afford a surface which will not only facilitate the movements of trucks, but will protect them in going over grades.

Pittsburg, Pa.—Ordinance offered providing \$450,000 for widening West Carson St., from the Point bridge to Steuben St., West End. Mayor E. V. Babcock.

Pittsburg, Pa.—An ordinance authorizing the opening of Thomas St., from North Lexington Ave. to North Richland Ave., was presented by President Heron.

Bristol, Tenn.—One of the chief subjects of discussion before business interests here at this time is the proposed plan of the city authorities to launch an extensive street improvement campaign, embracing practically all of the streets in the downtown section and many in the residence district. The subject is given unusual prominence in business routine because of the proximity of the mass meeting for threshing out the details of the proposition.

Austin, Tex.—The state highway commission granted the following applications for aid for construction of highways: Van Zandt county, federal aid not to exceed \$26,811, on highway No. 15, beginning at a point six miles south of Wills Point, thence to Kaufman county line; Hunt county, highway No. 11, beginning at the Fannin county line, thence southeast to a point twelve and one-half miles, to the beginning of the gravel road, state aid not to exceed \$8,149, in addition to state aid heretofore granted in the sum of \$19,026; Wharton county, state aid not to exceed \$2,625, on highway No. 3, beginning at Fort Bend county line, thence west to post office at East Bernard; Hunt county, state aid \$32,000, on highway No. 38, beginning at Wolfe City, then south through White Rock to a point about four miles north of Greenville; Mitchell county, fifty per cent. of cost of construction of not more than ten miles of highway No. 1. Highway No. 38 was more definitely designated, to begin at Greenville, thence north to White Rock, thence to Wolfe City, then to a point on highway No. 5 hereafter to be more definitely located.

Austin, Tex.—The attorney general approved \$100,000 of bonds for Newton county road district No. 1.

Austin, Tex.—The state highway commission has granted state aid to several additional counties for the construction of highways. Counties and the amount of state aid granted: Newton, \$25,000, on eastern loop of highway No. 8; Smith, \$5,000, on highway No. 26; Johnson, \$50,000, on highway No. 2-a; Hidalgo, \$15,000, on highway No. 12; Titus, \$4,134, on highway No. 1-a; Henderson, \$18,530, on highway No. 19 and \$5,840.60 on highway No. 31; Aransas, \$50,000, on highway No. 12; Angelina, \$7,000, on highway No. 37; Falls, \$8,210, on highway No. 2. The commission also increased allotments heretofore made to the following counties: Mitchell, \$15,000 to \$20,208.21, on highway No. 1, federal aid and state aid from \$8,230 to \$49,775; Fisher, \$10,000 to \$18,441.67, on highway No. 4, state aid, and \$35,000 to \$46,429 federal on highway No. 4; Anderson, from \$20,000 to \$40,000 federal, on highway No. 22; Culberson, from 50 per cent. of cost of construction of road to \$38,718.75 state.

Austin, Tex.—The attorney general approved bond issue, Ector county road and bridge, \$3,000.

Cuero, Tex.—At the election to be held July 16 citizens to vote \$40,000 bond issue for the improvement of 13 miles of Middlebuster highway, between Cuero and Victoria county line.

Richmond, Va.—City Engineer Bolling was directed by the administrative board

to make repairs to the roadbed of Lewis St., leading to the Hebrew cemetery, fronting on the Southern railway tracks near Stag's lumber yard, at a cost not to exceed \$100. Also to file a blue print of the west side of Virginia Ave., Highland to Young Sts., to establish a grade crossing and assess damages. Allegations were ordered for granolithic paving for the sidewalks of Elm St., between Stuart and Park Aves., returnable July 16.

Iiwaco, Wash.—The county commissioners have decided to build a new road between Nahcotta and Oysterville, and work will probably be started this fall.

Okanogan, Wash.—Okanogan county will grade, drain, surface and construct all special structure in connection with the construction of P. H. No. 3-B. Plans and specifications on file with County Engineer H. E. Smith.

Madison, Wis.—State highway commission plans to build 1.8 mi. Lancaster-Platteville highway, Ellenboro twp., Grant Co., project No. 41. Work involves 183 cu. yd. rock and 9,689 cu. yd. earth excavation, 1,294.2 sq. yd. concrete surfacing, 16 ft. wide, 98.2 cu. yd. concrete in culverts, rip rap, pipe, etc.; also one 70-ft. riveted truss, steel span bridge on same road, 20-ft. roadway and concrete floor. About \$131,700.

Madison, Wis.—State highway commission soon lets contract building Endeavor-Packwaukee road, Marquette county, federal aid project No. 25. Work involves 19,940 cu. yd. excavation, 6,595 cu. yd. concrete, class "A," 36,413 sq. yd. gravel surfacing, 4.05 acres clearing and grubbing, etc. T. F. Mengal, Grand Rapids, division engineer.

Wascott, Wis.—County board passed resolution to transfer the funds of \$2,300 which were raised in this town last year to be used on the portion of the state highway system passing through the town to the improvement of the county roads instead.

Columbia, S. C.—The following road projects approved by sanitary drainage commission: 2.12 mi., Richland county, \$51,679; 2.84 mi. asphaltic and 12.06 mi. concrete and top soil roads, Spartanburg county, \$121,717; 4.9 mi. concrete and top soil road, Greenville county, \$35,540; 3 mi. concrete road, York county, \$36,758; 2.14 mi. gravel road, Chesterfield county, \$13,505; 3.51 mi. earth road and bridge, Marion Co., \$54,679; 20.42 mi. sand clay road, Horry county, \$44,574; 20.17 mi. sand clay road, Bamberg county, \$26,129; 5.63 mi. top soil and gravel road, Newberry county, \$16,179; 22.34 mi. gravel and granite road, Lancaster county, \$40,297; 9.46 mi. top soil road, Chester county, \$53,769; 3.73 mi. concrete road, Charleston county, \$135,764; 14 mi. road and Lockhart bridge, Union and Chester counties, \$44,868. Cost to be borne by government and counties.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Joliet, Ill.—City council awarded the following contracts: *R. F. Conway Co., for the paving of McDonough St.; estimate cost \$23,459; *Ralph Newkirk Co., for brick paving of Chicago St.; *Curtis & Tyndall, for sewer on McDonough St.

Fort Scott, Kan.—*Thogmartin & Gardner, Fort Scott, for paving Wall St. from Wilson to Hill Sts., 4-in. vitrified fiber brick.

Independence, Mo.—*Davidson Bros., Kansas City, at \$14,615, for grading and macadamizing portion Sterling-Douglas road from Columbus to Rock Creek; involves 35,000 cu. yd. earth excavation, 200 cu. yd. concrete, 9,500 sq. yd. macadam and 260 ft. 12 and 24-in. concrete pipe. Jackson county.

Independence, Mo.—Kansas Constr. Co., Armour blvd. and Locust St., Kansas City, Mo., \$15,640; C. Gidinsky, 3419 Kenwood, Kansas City, Mo., \$18,021; low bidders for grading and macadamizing 3½ mi. Frank Frick road. For building of Tripplett bridge, from P. A. Harting, 37th and Highland, Kansas City, Mo., \$7,593; W. Phillips, Butler, Mo., \$7,648. Commissioners, Jackson county.

Nashua, N. H.—*Winslow & Cummings, Nashua, for surfacing one-half mile with modified Topeka top. Highway department, F. E. Everett, state highway commissioner, State House, Concord, N. H.

Garfield, N. J.—*John T. Harrop Co. to improve Passaic St. for \$27,464.09; other bids: Belcher & Co., \$30,999, and N. J. O'Connell, \$32,408. The work will be done with state aid.

Paterson, N. J.—*Dancing Construction Co., for the construction of several culverts on Van Riper Ave. in East Paterson.

Saddle River, N. J.—*Samuel Braen, 115 Totowa Ave., Paterson, N. J., at \$990.30, for resurfacing Saddle River township. R. A. Smith, clerk, Warren Point, N. J. Alfred W. Williams, engineer, Lyric bldg., Hackensack, N. J.

Minetto, N. Y.—*Pathfinder Constr. Co., Fulton, N. Y., at \$7,805.85, for paving Minetto bridge, 210 cu. yd. concrete, 1,465 sq. yd. brick pavement, 2,400 ft. of wood railing. Spec. by state dept. of highways, Albany, N. Y. Oswego county, E. A. Howard, supt. highways, County Clerk's bldg., Oswego, N. Y.

Columbus, O.—Following contracts let, building roads in various counties as follows: Butler county, section "A-1," Eaton-Middletown road, grading and paving with brick, 1.40 mi., *Bigler Bros., Middletown, \$33,685. Fayette county, section "O," Hillsboro-Washington C. H. road, grading and paving with waterbound macadam, 2.23 mi., *Mark & Van Gundy, Washington C. H., \$24,329. Highland county, section "K," Hillsboro-Piketon road, grading and paving with waterbound macadam, 2.40 mi., *Bean & Co., Highland, \$26,395. Montgomery county, section "O," Dayton-Indianapolis road, grading and paving with reinforced concrete, 2.04 mi., *Clifton Hoolahan, Dayton, \$57,630. Section "R," Dayton-Troy road, grading and paving with concrete, 1 mi., *Ed. Ryan, Springfield, \$27,593. Section "P," Dayton-Greenville road, grading and paving with plain concrete, 3.27 mi., *D. A. Onkst & Son, Dayton, \$83,542. Section "A-1," Dayton-Lebanon road, grading and paving with concrete, 1.77 mi., *John Wroe, Dayton, \$45,546. Sandusky county, section "L-2," Fremont-Bellevue road, grading and paving with brick, 3.97 mi., *Modern Constr. Co., Fremont, \$184,038. Fairfield Co., section "G-1," Lancaster-New Lexington road, grading and paving with brick, .0625 mi., *O. M. Junk, Chillicothe, \$43,333.

Coalgate, Okla.—*C. G. Landon, 225½ West Grand St., Oklahoma, for building 16¼ mi. road, Coal county.

Dormont, Pa.—*Frank Mannella, 1407 N. Lang Ave., Pittsburgh, Pa., at \$3,500, for grading and sewerage in various streets. Boro. council. Douglass & McKnight, engineers, 1315 Union Bank bldg., Pittsburgh.

Georgetown, Tex.—*H. Brown, Temple, for building roads and bridges, Williamson county.

Houston, Tex.—County commissioners received bids June 17 for the improvement of the West Montgomery road. All bids were referred to the county engineer. For the supply of 47,000 cu. yd. of gravel were referred to the county engineer. Bids were also opened for one asphalt distributor. *Fred H. Burke, for hauling and spreading shell from Rambler's Switch, 87½¢ per cu. yd. The shell is to be used on the Webster road. For hauling shell to points on the Crosby road from Sheldon and Fauna, \$1.25 per yd.

Essex, Ont.—For the construction of cement sidewalks, *Frank Brown & Son. **Sault Ste. Marie, Ont.**—*Warren Bituminous Paving Co. of Ontario, Ltd., for 25,000 sq. yd. bitulithic pavement.

SEWERAGE AND SANITATION

Duluth, Minn.—\$9,000 has been authorized by city council for the construction of a sewer arm, connecting a trunk sewer in Russell St.

Springfield, Mo.—Plans to build sewerage system in Phelps Grove Park involves 1 mi. 12-in. sewers and laterals. O. D. Christman, city engineer.

Haledon, N. J.—H. J. Harder, engr., Patterson, engaged by borough to prepare plans for sewerage system and sewerage disposal plant.

Jamesburg, N. J.—New Jersey State Home for Boys considering sewerage system alterations; \$1,000. State architect, Francis H. Bent, State House, Trenton, N. J.

Morristown, N. J.—Bids called soon building sewerage system; \$25,000; vitrified tile pipe. Engr., A. S. Pierson, Trust county bldg.

New Lisbon, N. J.—The State Colony for Feeble-minded Males considering septic tank and drainage, \$3,000. T. Mac-

Cumber, supt. Francis H. Bent, State House, Trenton, N. J., architect.

Albany, N. Y.—Ordinance is being considered by council for laying sewer in Frisbie Ave., from Second Ave. southerly about 300 ft. R. F. Lanagan, city engineer.

Erie, Pa.—An ordinance providing for the construction of a 12-in. sanitary sewer in French St., extending from a point 10 feet north of the center of 26th St. southwardly 720 feet. The passage is now pending in the council. M. J. Henry, clerk, city council.

Johnstown, Pa.—Council passed ordinance providing for extensive improvements along the Millcreek road, laying of sanitary and storm sewers, grading and paving of the thoroughfare in the 5th and 6th wards. The borough of Westmont and Upper Yoder township have joined in the construction of the roadway in their districts, and the city will complete the connecting link to Westmont, and the Ligonier Pike council has placed on the calendar bills providing for the paving of the Delaware Ave. subway.

Seranton, Pa.—City received no bids for installing sewer in 21st Ward; will readvertise.

Richmond, Va.—City plans to lay a sewer through Kuhn property which city now owns, adjoining Oakwood cemetery on the west side.

Edmundston, N. B.—See "Water Supply."

Mimico, Ont.—New sewers may be constructed on several streets here. Engineer, T. Lowes.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Sacramento, Cal.—*J. W. Terrell, for improving the alley between Seventh and Eighth Aves., from the manhole on La Solidad way to a point 706 feet westerly. Work involves: constructing an 8-inch vitrified ironstone pipe sewer; placing one 6-inch vitrified ironstone flusher, constructing one concrete manhole with cast-iron curb and cover, placing twenty-two 6-inch vitrified ironstone wye branches on 8-inch pipe sewer. D. W. Carmichael, president of the city commission. M. J. Desmond, city clerk.

Sacramento, Cal.—*J. W. Terrell, for improving the alley between 35th St. and 36th St., from the manhole in place in V St. to a point 1,300 feet northerly; work involves constructing a 10-in. vitrified ironstone pipe sewer from the manhole in place in V St. to a point 400 feet northerly therefrom, thence constructing an 8-in. vitrified ironstone pipe sewer from the last mentioned point to a point 900 feet northerly therefrom; placing one 6-in. vitrified ironstone flusher branch; constructing 3 concrete manholes complete with cast-iron curbs and covers; placing 18 6-in. vitrified ironstone wye branches on 10-in. pipe sewer; placing 40 6-in. vitrified ironstone wye branches on 8-in. pipe sewer. D. W. Carmichael, president of the city commission; M. J. Desmond, city clerk.

Chicago, Ill.—*T. J. Forschner Contg. Co., West Pullman, \$724,000 on work under Div. A, except item 18, Sanitary Dist. will pay half cost of work in excess of this amount up to \$905,278, contractor to credit district with half difference between \$724,000 and actual cost in case it is less than this figure; contractor to furnish 6 pumps in Div. B, \$254,300 and 72-in. pump, \$46,000 (this pump optional with district), 8 motors in Div. C, \$120,000; switchboard, etc., Div. D, \$49,495; for building sewage pumping station. Trustees Sanitary Dist. 910, South Michigan Ave.

Chicago, Ill.—*Ryan Co., 4500 West Division St., New England Ave., from Belmont to Diversey Sts., involving 2,680 ft. 12-18-in. vitrified pipe, 21 brick manholes and 16 catch basins, \$5,133; Latrobe Ave., from Fullerton to Palmer Sts., 1,375 ft. 10-15-in. vitrified pipe, 10 brick manholes and 10 catch basins, \$2,408; Nassau Ave., from Nagle to Ravenswood Sts., 2,100 12-18-in. vitrified pipe, 15 brick manholes and 24 catch basins, \$4,531; *G. Pontarelli, Chicago, Gramville, Thome and Highland Aves., Claremont and Irving Sts., Oakley Blvd. and alley south of Devan Ave., involving 1,700 ft. 2½-3½-ft. brick sewer, 9,198 ft. 12-22-in. tile, 67 brick manholes and 109 catch basins, \$31,422; *American Sewer & Drain Constr. Co., 2816 West Washtenaw Ave., Norwood St., from Broadway to Glenwood St., involving 1,300 ft. 12-18-in. vitrified pipe, 11 brick

manholes, \$3,801; *A. Mancini, Chicago, Montrose Ave., from two points east of Clarendon Ave., involving 460 ft. 12-in. vitrified pipe and 4 brick manholes, \$1,063; *D. Kostner to Kilbourn Sts., involving 1,730 ft. 12-18-in. vitrified pipe, 13 manholes and 8 catch basins, \$4,146; building sewers and installing manholes and catch basins. Board local improvements.

Hastings, Mich.—*Wm. O'Connor, building Phillip drain in Hope township, Barry county. D. S. England, drainage commissioner.

Paulsboro, N. J.—*C. F. Hamilton, Inc., Franklinville, N. J., building sewage disposal system, \$100,000. Engineers, Remington & Vosburg, northeast cor. 6th and Market Sts., Camden, N. J.

East Cleveland, O.—*Haddad Moll, 640 Bradley St., Cleveland, O., for sewer, curb connections. City council. C. M. Osborn, city manager. C. A. Carran, clerk, Town Hall.

Asplwall, Pa.—*Manella Constr. Co., 1507 N. Lang Ave., Pittsburgh, Pa., for installing sewer in 8th St., at \$3,000. Boro. council. S. R. Chase, clerk, 230 1st St.

Dormont, Pa.—See "Streets and Roads." **Erie, Pa.**—*Pohlwell Ahlskog Co., of Chicago, at \$39,543.75, for building the Mill Creek tube from 21st St. south to city limits. Two conditions are attached to the contract—one is that it is not valid if the Capital Issues Committee at Washington refuses to sanction the bond issue, and that it is not valid unless the bonds can be sold.

Roanoke, Va.—*Tinsley Constr. Co., at \$30,000, for storm drain in Kirk Ave. between Jefferson and Nelson Sts. City council. C. B. Moosman, mayor.

WATER SUPPLY

Palo Alto, Cal.—Will buy 40 service meters, one large flow meter and put in 40 service connections. J. F. Bixby, Jr., city engr.

San Francisco, Cal.—The following applications for a permit to appropriate water have been filed with the state water commission: E. J. Tobin, of San Francisco, 7½ cu. ft. per second of the waters of Willow Creek, tributary to Sacramento River, in Glenn Co., for irrigation purposes. The proposed main ditch to be ½ mile in length, and the diversion dam 6 ft. high, 50 ft. long on top and 30 ft. at bottom, to be constructed of earth, rock and brush. Horace L. Hill, Jr., of Los Altos, 15 cu. ft. per second of the waters of the Sacramento River in Yolo Co., for the irrigation of 375 acres by means of a pumping plant, at an estimated cost of \$3,500. Guilbert A. Jones, Yreka, 1 in. of water from a spring tributary to Shasta River in Siskiyou Co., for the irrigation of 4 acres. The proposed works consists of a concrete diversion dam 4 ft. high, 8 ft. long on top and 4 ft. long at bottom, and a pipe line 1,100 ft. in length. Mrs. Edith Bvas, San Andreas, ¼ cu. ft. per second of the water of Willow Creek, in Calaveras Co., for the irrigation of 10 acres by means of a ditch 300 yds. long. Royal A. Payne and Gertrude P. French, Alturas, 800 acre ft. per annum of the waters of Fitzhugh Creek, Modoc Co., for irrigation purposes. The water is to be conveyed from point of diversion to storage reservoir by means of a ditch, and thence to be conducted to lands of applicants by means of natural channels and ditches. The same applicants have filed individual applications—Royal A. Payne, Appl. 993, for 350 ac. ft. and Gertrude P. French, Appl. 994, for 400 ac. ft. per annum of the waters of Fitzhugh Creek, which applications contain practically the same terms and conditions as Appl. The United States of America (U. S. Reclamation Project at Orland, Cal.), 250 cu. ft. per second of the waters of Stony Creek in Glenn Co., Colusa and Tehama Cos., tributary to the Sacramento River for the irrigation of 30,000 acres. This is the south diversion of the Orland project, and it is proposed to enlarge the old canal 5.8 miles and build 17.44 miles of new canal. The diversion works consist of a dam 24 ft. high, 900 ft. long on top and 900 ft. long on bottom, constructed of concrete cap on piling with loose rock below, and having a concrete headgate. The amount of water to be stored is 104,000 acre ft., and the estimated cost of the proposed work, including purchase of right of way, is \$2,200,000. Cyrus Crawford, Seiad Valley, 25 cu. ft. per second of the East and West Forks of Seiad Creek (12½ c. f. s. from each branch) in Siskiyou Co., for mining purposes. Applicant proposes to construct ditches two miles in length, at an estimated cost of \$15,000. U. S. Indian Service, Los Angeles, Cal., ½ cu. ft. per second of the waters of Oak Creek in Riverside Co., tributary to San Jacinto River, for the irrigation of 65 acres on Soboba Indian Reservation. The proposed works consists of a pipe line and concrete dam, and the estimated cost of the diversion is \$2,000. D. W. Bisbee, Los Angeles, 75-100ths cu. ft. per second of the waters of an unnamed stream in Revenue Canyon, Inyo Co., for mining purposes. Water to be conducted to place of use by means of a pipe line 800 ft. long and used to operate a flotation machine at copper mine of Argus Copper Co., in Revenue Canyon. Water to be returned to stream after use. Russel C. Jensen, Reno, Nev., 5 cu. ft. per second from Purdy Creek, 2 cu. ft. per second from Robinson Creek, 2 cu. ft. per second from Freeman Creek and 2 cu. ft. per second from an unnamed stream, all in Sierra Co., and all tributary to Long Valley Creek, for the irrigation of 420 acres. The water proposed to be appropriated is the flood water of said creeks, sufficient to fill a reservoir of 950 ac. ft. capacity. The amount of water to be stored is 840 ac. ft. per annum, and the estimated cost of the proposed diversion is \$9,000. Chas. E. Warren, Newhall, ¼ cu. ft. per second of the waters of Newhall Creek, in Los Angeles Co., tributary to the Santa Clara River, for the irrigation of about 25 acres by means of a pipe line 1,000 ft. long and a diversion dam 4 ft. high, 40 ft. long on top and 30 ft. long on bottom. J. H. Wilkie, Yuba City, 50 cu. ft. per second of the waters of Cedar Grove Ravine, in Sierra Co., tributary to Slate Creek, for placer mining purposes. Water to be utilized by means of diverting dam, ditch and pipe line, to be constructed at an estimated cost of \$10,000. J. H. Wilkie, Yuba City, 15 cu. ft. per second of the waters of Sawmill Gulch, Sierra Co., tributary to Slate Creek, for placer mining purposes. Proposed works consists of diverting dam, ditch and pipe line, cost of construction \$2,500. Clinton J. Bailey, Valley Center, 1½ cu. ft. per second of the waters of Uayma Creek, San Diego Co., tributary of San Louis Rey River, for the irrigation of 40 acres. Water to be diverted in flume to open ditches and distributed. H. J. Robinson, 100 miner's ins. of the waters of Knights Canyon, Inyo Co., for mining purposes. Water to be diverted by means of a steel pipe. C. A. DuVander, 1 cu. ft. per second of the waters of Pool Creek, Sonoma Co., tributary to Mark West Creek, for the irrigation of 40 acres. Applicant proposes to construct a diversion dam 3 ft. high, 30 ft. long on top and 20 ft. long on bottom and a storage reservoir of about 200,000 gallons capacity.

Canon City, Colo.—G. H. Sethman, engineer, 249 Equitable Bldg., Denver, engaged by city to prepare plans for water works improvements.

Moran, Kan.—Plans to improve water works system to include engine and generator set; about \$10,000. W. E. Young, clerk.

Louisville, Ky.—For building and installing new pumping engine for Crescent Hill pumping station, 30,000,000 to 40,000,000 gal. daily capacity, board of water commissioners shortly let contract. D. R. Lyman, city engineer.

Cumberland, Md.—City council passed order for laying 6-in. water main on Fayette St. extended, beginning at the intersection of Washington St. and running a distance of 825 feet on Fayette St.

Lowell, Mass.—Commissioner Brown will introduce in council an order for a loan of \$70,000 for the installation of additional wells on the boulevard; the Government will erect about 20 dwelling houses.

Ogilvie, Minn.—Contract soon let for building water works system. J. F. Druar, 312 Commercial Bldg., St. Paul, engineer.

Clifton City, N. J.—See "Lighting and Power."

Newark, N. J.—City sold to the Fidelity Trust Co. of Newark, acting for Harris, Forbes & Co., Esterbrook & Co., and Remick, Hodges & Co., of New York, an issue of \$250,000 5 per cent. water bonds at 104.81.

Frankfort, N. Y.—Will buy 800 ft. 6-in. cast-iron pipe, 15 water meters and make 15 house connections. Thomas Honohan, supt.

Perrysburg, O.—Ordinance passed by village council for the issuance \$9,000 water works bonds.

Ryan, Okla.—\$16,000 water extension bonds have been sold.

Downington, Pa.—Will buy 400 ft. 4-in. cast-iron pipe, 3 service meters, 2 large flow meters, put in 24 service connections, one 4-in. double action centrifugal pump, 165 ft. head. E. B. Wagner, supt.

Coleman, Tex.—On water works system project includes storage dam pumping station, etc. City plans to expend about \$100,000.

Bluefield, W. Va.—The special levy election here voted to raise \$54,000 for the purpose of providing additional funds for the purpose of paying \$10,000 to the Bluefield Water Works & Improvement Co. for water supply, fixed by the recent finding of the public service commission of the state; additional funds to install 100 additional fire plugs, and for the construction of additional fire fighting equipment, including a high-pressure engine, also to erect and equip a city incinerator.

Windsor, Ont.—Engr. Morris Knowles submitted four separate plans to supply the border cities with filtered water to the Essex border utilities commission. Projects Nos. 1 and 3, designed to supply the entire district from intakes near Peche Island and Askin's point, would cost \$1,814,000 and \$1,573,000, respectively. Projects Nos. 5, 2 and 4, which will supply Sandwich, Sandwich West and Ojibway, would entail expenditures of \$1,061,000 and \$932,000, the first named to have its source at the foot of Peche Island and the latter near Askin's point. Engr. Knowles submitted also an apportionment of cost for the four plans. Windsor's shares in Nos. 1 and 3 is placed at \$709,000 and \$615,000, while Ojibway would be expected to pay \$133,700 and \$118,000; Ford, \$99,700 and \$86,200; Walkerville, \$159,900 and \$139,500; Sandwich, \$159,200 and \$137,800, and Sandwich West \$138,300 and \$122,700. A resolution was adopted by Commissioners Woollett and Healy, requesting the water committee to obtain figures on the cost of the contemplated improvements to the Windsor and Walkerville plants and the construction of the Ojibway water works.

Nakusp, B. C.—Citizens are contemplating the installation of water works systems to cost approximately \$26,000.

Edmundston, N. B.—This municipality has sold \$40,000 6% bonds, which were issued on account of water and sewerage plans.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Joliet, Ill.—See "Streets and Roads."

Cumberland, Md.—City council passed order that commissioner of water and electric light purchase of the *Pittsburg Meter Co., one 4-in. Eureka water meter and 75 $\frac{3}{4}$ x $\frac{3}{4}$ -in. Keystone "W" meters, including connections.

Cumberland, Md.—Order was passed that the commissioner of water and electric light be authorized to purchase from the *U. S. Cast Iron Pipe & Foundry Co., one carload class "C" cast-iron water pipe, bell and spigot end—one-half 4-in. and one-half 6-in., at price of \$63.75 per 2,000 for the 4-in. size and \$60.75 for the 6-in. per 2,000.

Ravenna, O.—E. E. Morgan, Ravenna, \$55,082; F. George, 5301 Columbus St., Pittsburgh, Pa., \$58,023; Alger & Crouse, 701 Guardian Bldg., Cleveland, \$60,231, low bidders building city filtration plant.

Ablene, Tex.—*R. C. Lewis, of Ablene, for the construction of the Elm Creek water project to furnish Ablene with an inexhaustible water supply, approximately \$240,000 for the dam alone.

Prague, Okla.—*Oklahoma Electric Supply Co., 120 West Main St., Oklahoma, for improving water works and electric light plant; involves station, substation wiring and street lighting equipment including 21 $\frac{1}{2}$ miles transmission line. Motor driven pumps, automatic starting and stopping, and air compressors for air lifts, to *American Well Works Co. and *Gorden-Govern Co.

LIGHTING AND POWER

San Francisco, Cal.—A forward step in supplying the Bay points with 8,000 kilowatts of additional power was taken

when the Pacific Gas & Electric Co., California-Oregon Power Co. and the Northern California Power Co., Consolidated, signed the joint agreement carrying into effect the decision of the railroad commission, rendered in May last, authorizing the linking of these three systems of electric utilities to cope with the wartime shortage of power for expanding industrial needs. The total expenditure would probably amount to \$750,000 for the following: 1. The California-Oregon Power Co. to reinforce and reconstruct its transmission line from Copco to Castella and construct a 70,000-volt line from Castella to Kennett of sufficient capacity to transmit to the Northern California Power Co. at Kennett, 8,500 kilowatts. 2. The California-Oregon Power Co. to finance the Northern California Power Co. to the extent required to reinforce that company's lines from Coleman to near Hamilton City by the addition of 1-9 coper conductor to the west line, so that there can be delivered throughout the year to the Pacific Gas & Electric Co. at Colusa 8,000 kilowatts. 3. The Pacific Co. to construct a 60,000-volt transmission line of sufficient capacity from Colusa Corners, near Colusa, to the Drum-Cordelia unit. Construct a 100,000-volt line and install a substation of 12,000 kilowatts capacity from 60,000 to 100,000 volts to deliver the power into that line. Under the contract signed the Pacific Gas & Electric Co. will finance the construction of its own lines to Colusa, and the California-Oregon Power Co. will find the necessary capital—\$550,000—to care for its own construction and that of the Northern California Power Co., Consolidated.

Schaller, Ia.—Council is contemplating to issue \$35,000 in bonds for the installation of a municipal electric light plant.

Conrad, Mont.—\$10,000 bonds for lighting system have been sold.

Stamford, Neb.—Village voted \$9,500 light plant bonds. O. Anderson, village clerk.

Clifton City, N. J.—A resolution placing two more lights in DeMott Ave. was adopted. A fire hydrant was ordered placed at Christie and Lakeview Aves.

Germantown, O.—Town voted at special election to dispose of the municipal lighting plant. It is probable that a contract will now be entered into with the Dayton Power & Light Co. who has submitted a proposition to the town.

Washougal, Wash.—The plant of the local electric lighting company, situated on the Washougal River, near this city, destroyed by fire; total loss about \$15,000.

Matheson, Ont.—A new electric light and water works plant is contemplated here. Clerk, H. Geo. Ginn.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Albany, N. Y.—Section 2, Contract No. 185, *American Pipe & Constr. Co., 112 North Broad St., Philadelphia, Pa., \$154,395; installing electric wiring, lighting, power, battery charging equipment and auto truck scales for pier No. 6, East River, New York City, Contr. No. 105, to *Lord Electric Co., 105 West 40th St., New York City, \$16,000; improving river channel below dams at Scotia and Rotterdam, Erie Canal. W. W. Wother- spoon, supt. pub. wks.

Drummondville, Que.—*Morrow & Beatty, Peterboro, Ont., for construction of dam and power house on the St. Francis River here by the Southern Canada Power Co.

FIRE

Cumberland, Md.—City receiving bids for furnishing 1 triple combination chemical hose wagon and pump, motor propelled pump must deliver 300 gallons per minute at 120 lbs. net water pressure, and also must deliver one-half this quantity at 200 lbs. net pressure. T. A. K. Hummelshime, commissioner of police and fire dept.

Ayer, Mass.—Town contemplating erection new fire station. Chief Pelletier.

BRIDGES

San Jose, Cal.—Three new bridges of reinforced concrete, the largest of which is to be 75 feet in length, are to be erected by the county on the Pacheco passroad. Plans and specifications have been filed with the board of supervisors by County Engineer Irving Ryder and bids will be opened in July. The bridges are to replace old structures across gullies, creeks and depressions. The first bridge will be of three spans of 25 feet in length each, second will be two spans of ten feet each, third will be a four-span structure, each span ten feet in length, and the smallest will be one span of 20 feet. They will be constructed on the road between San Felipe and Gilroy.

South Portland, Me.—The public utilities commission issued an order on the petition of the municipal officers of South Portland ordering Skunk Hill bridge, in South Portland, to be rebuilt in such manner as to increase the width to 33 ft. and provide a sidewalk on one side. The headroom over the steam railroad tracks will be increased from 16 ft. 3 ins. to 18 ft. The estimated cost is \$25,000, of which 10 per cent. is to be paid by the Cumberland County Power & Light Co., and the balance, 55 per cent., 25 per cent. and 10 per cent., by the Portland Terminal Co., the State of Maine and the City of South Portland, respectively. This bridge is located in the state highway between Portland and Boston.

Harrisburgh, Pa.—City will get a new viaduct at State St. as a part of the Capital Park improvement extensions if the state promotes its half of the proposal.

Knoxville, Tenn.—Council considering submitting to the voters \$150,000 viaduct bonds.

Austin, Tex.—See "Streets and Roads."
St. John, N. B.—The Dominion Government plans to build a bridge in the parish of Canning. A smaller bridge will also have to be erected over a stream near Sypher's Cove, a beaver dam having caused a bad washout on the upper side of the stream.

County of Peterboro, Ont.—The county has sold a block of \$7,000 5% 20-installment bonds. The proceeds will be used for bridge construction and improvement of county property.

Tara, Ont.—Tenders are being called for the construction of concrete culverts.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Placerville, Cal.—*Arthur S. Lyon, of Smiths Flat, for the building of two bridges on the state highway between Shingle Springs and Whiterock, at \$6,150.

Pensacola, Fla.—County commissioners to construct a rolling lift bridge over Bayou Chico to *Converse Bridge & Steel Co., of Chattanooga, Tenn., for \$42,413.

Tipton Ford, Mo.—*Concrete Steel & Constr. Co., Joplin, at \$15,800, for building three 50-ft. span concrete bridge, 388 ft. long, 20 ft. wide over Shoal Creek; involves 238 ft. earth approach and fill, Newtown county.

Harrisburg, Pa.—Second Deputy State Highway Commissioner George H. Biles opened bids for the construction of bridges on state highway routes in Columbia, Crawford, Fayette, Northumberland and Sullivan counties. No proposals were submitted for the bridges proposed for State Highway Route 63, Oliver Twp., Jefferson Co.; State Highway Route 16, in Laporte Twp., Sullivan Co., and State Highway Route 27, in Union Twp., Union Co. Because the checks that accompanied his proposals were uncertified, the bids of D. J. Rogers, of Danville, for the construction of bridges on Route 283, in Upper Augusta Twp., Northumberland Co., were rejected. Deputy Commissioner Biles ordered the bids to be checked and stated that announcement regarding contract awards would be made later. The following bids were received: Columbia Co., Orange Twp., Reimard Bros., \$1,754; Columbia Co., Fishing Creek Twp., Reimard Bros., Bloomsburg, Pa., \$1,683.50; Columbia Co., Fishing Creek Twp., Reimard Bros., Bloomsburg, Pa., \$2,170.50; Columbia Co., Greenwood Twp., Reimard

Bros., Blomberg, Pa., \$1,796.05; Columbia Co., Pine Twp., Reimard Bros., Blomberg, Pa., \$2,092.05; Crawford Co., Hayfield Twp., B. W. Blystone, Cambridge Springs, Pa., \$1,590.96; Crawford Co., Hayfield Twp., Keystone Constr. Co., Meadville, Pa., \$1,779.40; Fayette Co., Washington Twp., Vincenzo Di Giorno, Fayette City, Pa., \$3,935.60; Fayette Co., Washington Twp., W. W. Schultz, New Kensington, Pa., \$3,612.74; Jefferson Co., Oliver, no bids received; Northumberland Co., Delaware Twp., W. A. Godcharles, Milton, Pa., \$1,480.40; Northumberland Co., Upper Augusta Twp., D. J. Rogers, Danville, rejected; Northumberland Co., Upper Augusta Twp., R. C. Fise, Shamokin Dam, Pa., \$1,643.80; Northumberland Co., Upper Augusta Twp., D. J. Rogers, Danville, rejected; Northumberland Co., Upper Augusta Twp., R. C. Fise, Shamokin Dam, Pa., \$2,120.40; Sullivan Co., Laporte Twp., no bids received; Sullivan Co., Cherry Twp., Busbone Constr. Co., Dushora, Pa., \$1,006.59; Union Co., Union Twp., no bids received.

Westmoreland, N. B.—Power & Brewer, 107 Prince William St., St. John, for the erection of a concrete arch bridge, cost \$21,500.

MISCELLANEOUS

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce)—A firm in Russia desires to be placed in communication with American railroad construction companies who would be willing to transfer some of their construction machinery to Russia; also wish to get in touch with contractors for mechanical supplies and with firms seeking a market for agricultural implements, gasoline engines, looms, transmission machinery, and machinery for the manufacture of agricultural implements. Correspondence should be in Russian or French. References. Refer to Opportunity No. 27,115.

Kokomo, Ind.—Two issues of Howard county bonds, \$60,600 and \$46,200, failed to sell. County Treasurer Davies reports.

Rockville, Ind.—Bids received July 20, 1918, at 1 p. m., by trustee of Jackson Twp., Parke Co., for sale \$1,800 bonds, 6 per cent., 5 years. Henry S. White, trustee.

Jamesburg, N. J.—New Jersey Home for Boys, care Capt. Drover, Jamesburg, considering drainage, \$7,500. State Architect F. H. Bent, State House, Trenton.

Brooklyn, N. Y.—The sinking fund commission voted unanimously to adopt the resolution for the approval of Dock Commissioner Hulbert's plan for build-

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ing 15 piers in Jamaica Bay abutting on land to be made by dumping street cleaning dirt in the bay. Fourteen of the piers are to be 200 ft. wide and the fifteenth is to be 100 ft. wide. The slips between them are to have a width of 300 ft.

Asheville, N. C.—City sold an issue of \$99,000 refunding bonds to R. M. Grant & Co. for \$100,860.03.

Toledo, O.—Council will, at special meeting, consider the enlarging Toledo University training camp at the end of Nebraska Ave. The Government wishes to enlarge the camp so that 300 men may be quartered and trained here for the period of the war.

Punxsutawney, Pa.—Finance committee will purchase at \$110 each dirt wagons. Street Commissioner Boney.

Dallas, Tex.—Mayor Lawther and the board of city commissioners have approved the 1918-19 budget of \$1,393,633.66 following the apportionment of some of the items: Police and fire signal, \$7,947; department of fire, \$304,016.28; department of police, \$225,399; sanitary sewers, \$67,189.90; sewage disposal, \$28,715; streets and bridges, \$126,269.60; street cleaning, \$189,501.26; comfort station, \$2,700; transfer to garbage removal fund, \$84,776.

Superior, Wis.—City commission accepted the offer of Spitzer, Rovich & Co., Chicago, to take over at par \$80,000 bond issue for the new jail and police headquarters.

Cheyenne, Wyo.—Gen. Supt. Wm. Jeffers of the U. P. Railroad informed the citizens that the United States Government had finally given consent to the expenditure of \$1,750,000 for new shops, enlarging and erecting new coal chutes, roundhouse and the terminal facilities in this city. Work will be pushed as fast as possible on the building.

New Castle, N. B.—The Eastern Securities Co., of St. John, was the successful

bidder for the \$40,000 improvement bonds.

Fort William, Ont.—\$225,000 for street railway purposes have been granted by the department of finance.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Newton, N. J.—Sussex county board of freeholders to *Good Roads Machinery Co., of Philadelphia, for furnishing a horse-driven tarvia distributor at \$902.

New York, N. Y.—Bureau Yards and Docks, Navy Department, received bids June 24, building radial block chimney at Wards Island, work complete, from Rust Eng. Co., Farmers Bank Bldg., Pittsburgh, Pa., \$11,690 (55 days), alternate \$8,600 (55 days); M. W. Kellogg Co., 90 West St., New York City, (1) \$11,939 (65 days) alternate \$2,060 (1b) \$6,550 (50 days), (2a) \$1,641, (2b) \$1,050, (3) \$6,350 (50 days), (3a) \$1,641, (3b) \$1,050; Heine Chimney Co., 123 West Madison St., Chicago, \$12,432 (55 days), alternate \$11,135 (50 days).

Rockaway, N. Y.—J. K. Turton Corp., 101 Park Ave., New York City, (a) \$184,700 (90 days) (b) deduct \$500; Wise Constr. Co., 40 Court St., Boston, Mass., (a) \$186,000 (80 days) (b) deduct \$15,000; Lustig Well, 103 Park Ave., New York City, (a) \$189,800 (150 days) (b) \$3,000; bids received June 24 for extension to naval air station: (a) price and time for work complete; contractor shall state time of completion of each building (b) amount and time added or deducted from (a) if shingles are used instead of siding. Bureau Yards and Docks, Navy Dept., Washington, D. C.

Tacoma, Wash.—*Tacoma Refuse & Collection Co., for five-year garbage collection contract. Mayor Riddell.

Books for the Waterworks Engineer or City Official

Waterworks Management and Maintenance.

By Winfield D. Hubbard and Wyncoop Kiersted.

Is probably the only book which deals to the extent of more than 400 pages solely with the operation of a water works system. It is, therefore, especially suitable for the superintendent or manager of a plant. Price, \$4.00.

Waterworks Handbook.

By A. D. Flinn, R. S. Weston and C. L. Bogert.

A new book which gives information for the waterworks engineer, superintendent, operator or inspector. The book treats of sources of supply, collection, transportation, distribution and treatment of water. Filtration and other forms of treatment are described. Specifications are given in plain language. 824 pages. Price, \$6.00 net.

Clean Water and How to Get It.

By Allen Hazen.

Mr. Hazen's book is a brief explanation in non-technical terms of why water should be purified, and the more generally used methods and appliances for purifying it. Its object is to set forth first principles for those who have no expert knowledge of the subject. 174 pages. Price, \$1.50.

Public Water Supplies.

By F. E. Turneure and H. L. Russell.

This describes the requirements, resources and construction of works for public water supplies and is prepared especially for the engineer, superintendent or other technical man. A chapter on pumping machinery has been contributed by D. W. Meade. It is in its second edition; contains about 800 pages. Price, \$5.00.

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STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Ore., Astoria	July 6	Regrading road	County Clerk.
Pa., Philadelphia	July 10	Asphalt paving, asphalt repaving, water bound macadam surfacing, bituminous and cement concrete resurfacing.	Fred C. Dunlap, Bureau of Highways.
N. Y., New York	3 p.m., July 11	Paving and repaving with asphalt mastic walks in parks.	Dept. of Parks.
Wash., Tacoma	July 11	Clearing and grubbing and grading 1.42 mile of road.	Bd. of Co. Commrs.
Mich., Berrien Springs	7 p.m., July 15	Paving streets	Harris C. Knotts, Village Clk.
Ore., Portland	2 p.m., July 17	Clearing, grubbing and excavating 9.5 miles of road.	District Engr., U. S. Office of Public Roads, 202 Broadway-Yamhill Bldg.
O., Dayton	July 26	Improving 3 miles of road with concrete or bituminous macadam	Stanley R. Sharts, Co. Engr.
SEWERAGE.				
Mont., Bozeman	July 5	2,100 ft. 8-in. sanitary sewer, wye branches, etc.	City Clerk.
Pa., Philadelphia	noon, July 9	Constructing main sewer	Geo. E. Datesman, Dir. Public Works.
WATER SUPPLY.				
N. J., Jersey City	2 p.m., July 16	Furnishing and delivering about 34,950 ft. 72-in. riveted steel pipe	Dir. of Streets & Pub. Impts.
FIRE EQUIPMENT.				
N. Y., New York	10.30 a.m., July 8	Furnishing and delivering cable	Thos. J. Drennan, Fire Comr.
BRIDGES.				
O., Dayton	10 a.m., July 6	Constructing concrete substructure for bridge	Walter H. Aszling, Co. Clk.
Pa., Philadelphia	July 10	Repairing and painting three bridges	Fred C. Dunlap, Bureau of Highways.
Ore., Portland	2 p.m., July 17	Constructing bridges and culverts	Dist. Engr., U. S. Office of Public Roads, Broadway-Yamhill Bldg.
MISCELLANEOUS.				
N. Y., New York	11 a.m., July 8	Furnishing and delivering pneumatic tires and inner tubes	Nicholas J. Hayes, Comr. of Water Supply, Gas & Elec.
N. Y., New York	11 a.m., July 10	Constructing building, runway, furnaces, appurtenances and chimney, including plumbing and gasfitting, of incinerator	M. E. Connolly, Boro. Pres. Queens, L. I. City.
N. Y., New York	noon, July 29	Dredging in Port Henry Harbor	U. S. Engr. Office, 44 Whitehall St., N. Y.

STREETS AND ROADS.

Grangeville, Idaho.—Survey for the highway to be built from the mouth of Rice Creek to Joseph Plains is completed. The proposed road is 13 miles long, and the grade is not more than 5 per cent, at any place; \$13,000 is to be raised by bond issue in the Joseph highway district, to be used in building the road.

Greenfield, Ind.—A \$6,300 issue of Hancock county highway improvement bonds was sold to Frank Steel, Greenfield, Ind., for \$6,310.55 and accrued interest.

Marshalltown, Ia.—The board of supervisors is considering changing a large section of the East Main St. road, partly as a result of the recent flood and partly to make the road permanent. It is planned to revise the road from the bend, about a mile east of the city, to the river bridge, by straightening the road from the bend all the way to the bridge and moving it a short distance toward the east. The plan also includes the elimination of all three of the bridges, two of which were destroyed by the flood, and substituting in their place one large bridge, probably as large as the bridge over the Iowa River, to provide an adequate waterway for water during ordinary floods.

Hagerstown, Md.—City attorney authorized to draw up an ordinance for the paving of West Washington St. from the Square to Jonathan St. Durax was the material discussed. Mayor Fahrney.

Livingston, Mont.—The dangerous road in the park between Mammoth and Gardiner is to be eliminated and a provision of \$75,000 to build a new road has been made, the money to be expended by the National Park service board.

Nashua, N. H.—State New Hampshire will probably ask for bids shortly for federal aid road project No. 16, 2½ miles asphalt, \$40,000. F. E. Everett, state highway comr., Concord, N. H.

Utica, N. Y.—Board of contract and supply determined the expense of resurfacing following streets: South St. from

the West Shore to Albany St., \$3,823.54; Plant St. from Francis St., 235 ft. westerly, \$2,052.21; Clinton Pl. between Genesee and Oneida Sts., \$5,790.18; Oneida St., between Pleasant St. and the city line, \$22,702.99.

Canton, O.—Council approved ordinances to establish the grade of McGregor Ave. N. W. from Eighth St. N. W. to Cottage Pl. N. W., and of Ray Pl. N. W. from McGregor Ave. N. W. to Brown Ave. N. W. C. E. Poorman, mayor.

Astoria, Ore.—Bid to improve Irving from Sixth to Eighth for the sum of \$12,282.55 was rejected.

Philadelphia, Pa.—Work valued at approximately \$180,000, for which bids will be received July 10: "A" asphalt paving, "B" asphalt repaving, "C" waterbound macadam surfacing, "D" bituminous and cement concrete resurfacing, "E" repairing and painting bridges. The names and limits of the highways to be improved are as indicated: Schedule "A," asphalt paving, Richmond St. from Bridge to Kennedy; schedule "B," asphalt repaving, Ridge St. from Dupont to Lyceum; schedule "C," waterbound macadam surfacing, Ontario St. from Bath to Phila. Belt Line R. R.; schedule "D," bituminous and cement concrete resurfacing, Frankfort St. from Linden to Poquessing Creek; schedule "E," repairing and painting bridges, Passyunk Ave. Bridge over Schuylkill River, Walnut Lane Bridge over Frankford Creek, Wyoming Ave. Bridge over Lincoln Drive. Fred C. Dunlap, chief bureau of highways; Geo. E. Datesman, director, dept. of public works. Fred C. Dunlap, chief bureau of highways.

Central Falls, R. I.—To the city council joint standing committee on finance was referred the following resolutions: To appropriate \$4,500 additional for the widening of Broad St., between Clay and Cross Sts.; \$3,000 additional for the water department; \$2,500 for macadamizing and improving Fuller Ave. between Summer and Garfield Sts.

Bixby, S. D.—At a meeting held here by representatives of the Black Hills Au-

tomobile Trail Association, arrangements were made for this year's construction work on the trail through Meade and Perkins counties. It was decided that the trail should go by way of Tama and Opal after leaving Bixby, to join a highway which Meade county has constructed out from Sturgis. It also was voted to have each town raise its share of expense money at once.

Colfax, Wash.—The Whitman county commissioners plan construction of another road costing over \$100,000 if the government will approve the application of the commissioners for right to issue securities for the cost of the work.

Tacoma, Wash.—In addition to the 2-mile paving strip which the county is now constructing from the Grand Forks junction of the Tacoma-Puyallup hill road to the Puyallup city limits, near the Western Washington Experimental Station, the county commissioners decided to pave the third side of the triangle formed by the diversion of the roads at Grand Forks.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Bangor, Ore.—Murtagh Hughes of Bangor was the only bidder on the construction of a piece of gravel road between Bangor to Hermon, a distance of six-tenths of a mile. State highway commission.

Portland, Ore.—The following bids for street improvements were opened June 19: No bids were received for the improvement of Moody St. from Gibbs St. to Woods St.; improvement of Smith Ave. from Fessenden St. to Bristol St., S. Simonsen, grading and sidewalks, \$2,829.01; the United Contracting Co., grading and sidewalks, \$2,804.02; improvement of East Lincoln St. from the west line of East 52d St. to east line of East 52d St., Warren Construction Co., gravel bitulithic pavement in roadway, \$2 per sq. yd.; S. Simonsen, concrete pavement in roadway, \$2 per sq. yd., \$1,521.

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Bids received until July 11, 1918.

Highway Reconstruction HARRISBURG, PA.

Pennsylvania State Highway Department, Harrisburg, Pa.—Sealed proposals will be received at said office until 10 A. M., July 11, 1918, when bids will be publicly opened and scheduled and contracts awarded as soon thereafter as possible for the reconstruction of the following pavements: 1,269 linear feet of One Course Plain Cement Concrete in Blair County; 4,983 linear feet of either Vitrified Block on a Concrete Base or One Course Plain Cement Concrete in Cambria County; 17,049 linear feet of One Course Plain Cement Concrete and 2,334 linear feet of either One Course Plain Cement Concrete or Bituminous Concrete and Hillside Vitrified Block on a Concrete Foundation in Chester County; 1,842 linear feet of Vitrified Block in Clarion County; 15,918 linear feet of either One Course Plain Cement Concrete or Bituminous Concrete on a Concrete Foundation in Erie County; 13,881 linear feet of One Course Plain Cement Concrete in Mercer County; 18,083 linear feet of One Course Plain Cement Concrete and Hillside Vitrified Block on a Concrete Foundation in Greene County and for the grading and drainage of 3,319 feet of roadway in Washington County. Bidding blanks and specifications may be obtained free and plans upon payment of \$2.50 per set upon application to State Highway Department, Harrisburg. No refund for plans returned. They can also be seen at office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia, and 904 Hartje Building, Pittsburgh. J. D. O'NEIL, State Highway Commissioner.

Bids received until July 17, 1918.

Notice to Bidders for Sewer Construction RHINELANDER, WIS.

Sealed bids will be received by the City of Rhinelander, Wis., for doing the work (the city to furnish the pipe) in the construction of about 2,628 feet of Sanitary and Storm Sewer with appurtenances.

Plans and specifications are on file with the City Clerk of said City for the inspection of prospective bidders.

Bids must be received by the City Clerk on or before July 17, 1918, at 3:00 o'clock P. M., and must be marked on the outside "Sewer Bids."

A certified check in the amount of three hundred dollars (\$300.00) is required to accompany each bid, conditioned for the successful bidder entering into contract for completion of the work.

The City reserves the right to reject any and all bids.

JOHN D. GILLIGAN, City Clerk.

Bids received until July 16, 1918.

Paving WILMINGTON, DEL.

Sealed bids will be received by the Board of Directors of the Street and Sewer Department of the City of Wilmington, Delaware, at the office of said Department, Room 251, City Hall, until 11:00 o'clock A. M., Tuesday, July 16, 1918, for grading, excavating, constructing concrete foundation and laying pavement of Sheet Asphalt with Vitrified Block Gutters and with Vitrified Blocks between the rails and for three courses outside rails, or Asphalt Block, from curb to curb, on Delaware Avenue from a point between Orange and Tatnall Streets to a point between Van Buren and Harrison Streets, approximately 20,000 square yards, under instructions and specifications of the Street and Sewer Department, which instructions and specifications, together with proposal blanks, may be obtained at the said office. The bids will be publicly opened at the aforesaid time. The right is reserved to reject any or all bids or to accept any portions of the bids.

BOARD OF DIRECTORS OF THE
STREET AND SEWER DEPARTMENT,
Attest: FRANK W. PIERSON, Secretary.

Bids received until July 19, 1918.

State Highway Work HARRISBURG, PA.

Pennsylvania State Highway Department, Harrisburg, Pa.—Sealed proposals will be received at said office until 10:00 A. M., July 19, 1918, when bids will be publicly opened and scheduled, and contract awarded as soon thereafter as possible, for the reconstruction of 19,318 linear feet of Plain Cement Concrete, and Hillside Vitrified Block Pavement, 16 feet wide, situated in Cecil and North Strabane Townships, Washington County, on Route No. 108. Bidding blanks and specifications may be obtained free, and plans upon payment of \$2.50 per set, upon application to State Highway Department, Harrisburg. No refund for plans returned. They can also be seen at office of State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; 904 Hartje Building, Pittsburgh, and 110 South Main Street, Washington, Pa. J. D. O'NEIL, State Highway Commissioner.

PROPOSAL ADS in

Municipal Journal

Bring Results

Bids received until July 11, 1918.

Water Mains

ANN ARBOR, MICHIGAN

Sealed proposals will be received by the Water Works Department of the City of Ann Arbor, Michigan, at the office of George S. Vandawarker, Manager, until 2:00 o'clock P. M., Central Standard time, Thursday, July 11, 1918, for laying with valves and special castings appurtenant thereto, approximately 18,000 feet of 20-inch cast-iron water main.

A certified check for a sum not less than five per cent. of the estimated amount of the proposal will be required.

Information for bidders, form of proposal and contract, plans and specifications, may be examined at the offices of the undersigned or may be obtained from Holland, Ackerman & Holland, Consulting Engineers, Lawrence Building, Ann Arbor, Michigan, upon the deposit of ten dollars (\$10.00) which will be refunded upon their return.

The Water Works Department reserves the right to reject any or all bids and to waive defects in form.

WATER WORKS DEPARTMENT,
GEO. S. VANDAWARKER, Manager,
HOLLAND, ACKERMAN & HOLLAND,
Consulting Engineers.

Bids received until July 16, 1918.

Notice to Steel Pipe Contractors JERSEY CITY, N. J.

Sealed proposals will be received by the Board of Commissioners of Jersey City, TUESDAY, JULY 16, 1918,

at 2:00 P. M., in the Assembly Chamber, City Hall, Jersey City,

FOR FURNISHING AND DELIVERING ABOUT 34,590 LINEAL FEET OF 72-INCH RIVETED STEEL PIPE FOR USE BY JERSEY CITY, NEW JERSEY,

in accordance with plans and specifications on file in the office of the City Clerk, City Hall, Jersey City.

Blank forms of bid, showing estimate of quantities, and agreements of sureties must be obtained at the office of the Director of Streets and Public Improvements, City Hall, Jersey City, N. J., or Clyde Potts, Consulting Engineer, 30 Church Street, New York City.

Proposals must be enclosed in sealed envelopes, endorsed "Proposal for Furnishing 72-Inch Riveted Steel Pipe for Jersey City, N. J.," directed to this Board and handed to the City Clerk in open meeting when called for in the order of business relating to sealed proposals.

The bonds required to be furnished on proposals (and a possible subsequent contract) are those of some surety company authorized to do business in the State of New Jersey, or a certified check will be accepted in lieu of bond. All bonds must comply with the provisions of Chapter 75, Laws of New Jersey, 1918.

The Board reserves the right to reject any or all proposals if it is considered for the best interests of the city so to do.

By order of the Board of Commissioners of Jersey City.

DANIEL O'REGAN,

Acting City Clerk.

Dated City Clerk's Office, Jersey City, June 24, 1918.

Auburn, Wash.—The Kaiser Paving Co., Everett, submitted the only bid, \$12,014, for the paving of East First St. The improvement will be one-course concrete 25 ft. wide.

Seattle, Wash.—W. A. Kupoff for grading Sixth Ave. City Engr. Dimock.

SEWERAGE

Mt. Pleasant, Ia.—City considering the building of $\frac{1}{2}$ to $\frac{3}{4}$ mile 12-in. sewer in E. Henry St. W. D. Worthington, city clerk.

Bozeman, Mont.—City Clerk Spieth soon receiving bids for the construction of a sanitary sewer in S. I. W. 165. The sewer will be 2,100 ft. long of 8-in. standard sewer pipe, 160 8x6 wye branches with stoppers, 7 manholes with covers and 2,420 lin. ft. of trenching, pipe laying and backfill.

Bozeman, Mont.—C. A. Spieth, city clerk, reports the council has passed a resolution providing for the construction of a sanitary sewer in S. I. D. No. 166 at a cost of \$1,834. Also a resolution for the construction of a sanitary sewer in S. I. D. 167 at a cost of \$653.

Kansas City, Mo.—Bids rejected building sewage disposal plant. Engrs., Black & Veatch, 507 Inter-State Bldg. Wallace Derringer, City clerk.

Dover, N. J.—Appointment of a sewerage commission for Dover was made. The new commission will take up the building of a sewerage system to connect with the proposed Jersey City trunk line to protect the Rockaway River from contamination. Voters, however, must first ratify a bond issue proposal.

Johnstown, N. Y.—City plans to lay about 1,990 ft. of new sewer. Mayor Smith.

Canton, O.—It will cost approximately \$113,000 to make all the additions to the sewage plant that should be made, according to figures submitted to service director DeCorps by consulting engineer R. W. Pratt, of Cleveland, and in turn given to council. The cost of increasing the capacity of the plant 50 per cent is put at \$70,000, while the cost of covering beds with glass is placed at \$25,000 and the cost of additional sludge beds \$8,000.

Canton, O.—Resolution approved to construct a sewer in Cherry Ave. NE from 12th St. NE to 13th St. NE 13th St. NE from Cherry Ave. to Gibbs St. NE Spring Ave. NE from 12th St. NE to 14th St. NE and Sherlock Pl. NE from Spring Ave. NE to Gibbs Ave. NE. W. Edgar Jackson, clerk of the council.

Dayton, O.—Engr. Fred Eichelberger, city hall, completed plans to build sewer in Frederick, Cornell and Summit Sts., 1,250 ft. 8 in. vit. pipe.

Dover, O.—Bids soon called for storm water sewer and back filling several streets. Geo. Arnold, engr., New Philadelphia, O.

Ashley, Pa.—Plans soon to start build sewer system, \$50,000. Boyle & Howe, engr., Bonnett bldg., Wilkes-Barre, Pa. James Gaughan, pres. boro. council.

Towanda, Pa.—Borough plans sanitary sewer, \$2,400 T. c. pipe sewer, approx. 1,200 lin. ft. 8 and 10-in. sewer. Wm. T. Howye, boro. mgr.

Wilkes-Barre, Pa.—Boyle & Howe, engr., Bonnett bldg., preparing plans building sanitary sewer system \$75,000, Hanover township. F. C. Rowe, boro. sec'y, Hazel street.

Milwaukee, Wis.—City council approved ordinance for its issuance \$200,000 bonds for constructing sewers. Daniel W. Hoan, mayor.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Hartford, Conn.—A. W. Byrne, 29 Kelsey St., installing sewers between Park and Willow Sts. Board of Contract & Supply, City Hall.

Cicero, Ill.—C. M. Porter, 111 W. Washington St., Chicago, Ill., for installing sewers in several locations. Town Council, L. Moncreig, engr., Town Hall.

Eldorado, Kans.—E. M. Eby for building 3,400 lin. ft. concrete storm sewer. City Council, A. B. Eaton, City Engr.

Canton, O.—Dominick Nickales, 1533 E. Tuscarawas St., at \$35,264, *F. A. Downs Constr. Co., 6th St., S. W., at \$15,594; *Burd Constr. Co., 1043 Spring Ave., N. E., at \$27,292; *Wise Bros., 1132 11th St., N. W., at \$11,714; and *Garaux Bros., 235 S. Market St., at \$11,720 for storm water sewer, san. sewer and street improvement in Stark county. City Council, W. E. Sarver, city engr., City Hall.

Cleveland, O.—George Bros., 1448 Bolivar road, for installing sewers. City Council, Robert Hoffman, engr.

WATER SUPPLY.

San Diego, Cal.—U. S. Govt., Navy dept., chf., bureau yards and docks, Washington, D. C., have plans completed for fresh water supply system, \$1,400.

Lawrence, Kans.—City commission plans improvements with city water system involving an expense in the neighborhood of \$100,000, may lay 16 with new mains. Water meters will be purchased to place one in every service pipe in the city. Repair the present main across the Kansas river bridge and place in condition to supply water to South Lawrence.

New Ulm, Minn.—City has petition under consideration water main extension, S. Franklin St.; east iron, 7 blks. Wm. Backer, city clerk.

Shiprock, N. Mex.—Dept. of Interior Office of Indian Affairs, Cato Sells, Comr., Washington, D. C., receiving bids soon for water supply, distributing system and sewer system at Toadiene School, Shiprock.

Morris Plains, N. J.—New Jersey State Hospital considering water mains, \$10,000. F. H. Bent, state archt., State House, Trenton.

Central Falls, R. I.—See "Streets and Roads."

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Boston, Mass.—Frank Drinkwater, 35 Hemlock St., West Roxbury, Mass., for laying water pipes in Metropolitan Ave., Hyde Park. City council. Thos. F. Sullivan, comr. public works, City Hall annex.

Marshall, Minn.—Hector Coulsett, for water mains, 3,000 ft. 8 to 10-in. cast iron. City council. A. G. Bumford, clerk.

Springfield, Minn.—J. Clausen, for mains, 360 ft. water mains, 1 hydrant 6 ft. deep. Village council. J. Fernhelz, recorder.

Wabasha, Minn.—Aug. Marsch, for water mains. City council. J. M. Schonweiler, recorder.

Joplin, Mo.—Perry Crossman, to sink a deep well at Schifferdecker park to supply water for the park swimming pool and other park purposes, \$150 a foot for drilling. Park board. Mayor Osborne.

Pittsburgh, Pa.—Booth & Flinn, Ltd., 1942 Forbes St., Pittsburgh, for water pipe line on Chartiers Ave., between Corliss and Strake Sts. City council. F. V. Babcock, mayor.

Fort Bliss, Tex.—Jennings Constr. & Engr. Co., El Paso, Tex., at \$25,000, for water pumping plant. U. S. Government. Lieut.-Col. R. C. Marshall, Jr., constr. div., 7th and B Sts., S. W., Washington, D. C.

LIGHTING AND POWER.

Los Angeles, Cal.—Resolution adopted authorizing the board of public works to advertise for bids for the lighting of the public streets and other public places in the Hollywood and East Hollywood districts for period beginning July 1, 1918, and ending June 30, 1919.

Bradentown, Fla.—Plans are being prepared for the installation of a municipal electric lighting plant.

FIRE EQUIPMENT.

Tacoma, Wash.—City council passed an ordinance introduced by Commissioner of Public Safety Pettit to sell the 10 remaining pieces of horse-drawn fire apparatus, together with 30 head of horses, and purchase in their stead motorized equipment. It is contemplated to buy seven new pieces, six of them chemical action, pump engines, and one general service truck.

BRIDGES.

Toledo, O.—Bond issues aggregating \$11,000 have been approved by the county commissioners for improvement of various bridges and culverts on roads leading to the new fair grounds.

Harrisburg, Pa.—Work on the new Reading Railway bridge to be constructed across the Susquehanna river at a point south of the present bridge will likely be started during the latter part of August or the early part of September, Paul Voorhees, resident engineer for the Reading Railway Co., announced. The viaduct, which will be approximately one mile long, will be erected at an estimated cost of \$2,000,000.

Philadelphia, Pa.—See "Streets and Roads."

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Ogdensburg, N. Y.—John A. Wert, for the construction of a concrete bridge over the canal on Main St. and the building of the raceway, \$10,466. Board of public works.

MISCELLANEOUS.

Frankfort, Ky.—Mr. John C. Noel, president of the Farmers' Deposit Bank, Frankfort, Ky., successful bidder for the issue of \$50,000 county refunding bonds.

Norfolk, Va.—City Manager Bates announced that he has been informed by one of the harbor masters that the government has consented to rebuild the wharf at the east end of High St.

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1-Sullivan, 2 stage air, simple steam, capacity 1800' at 80 to 100 lbs.....	2,500
2-14x12 Bury Duplex, belt driven, capacity about 550' at 60 to 80 lbs., each.....	1,000
1-14x16x10x16 Sullivan, 2 stage air, simple steam, capacity 600' at 80 to 100 lbs....	1,500
1-14x9x10 Bury, 2 stage, belt driven, capacity 350'	1,500
1-Ingersoll-Rand Imperial Type XB2, 500'..	2,000

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1-Monaghan-Walker steam machine, with 50' boom, 1½ yd. bucket, almost new....	\$7,000
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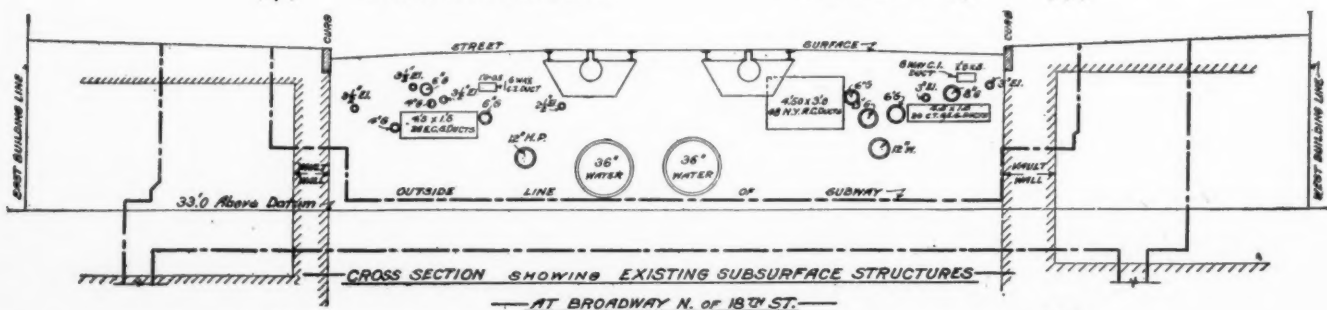
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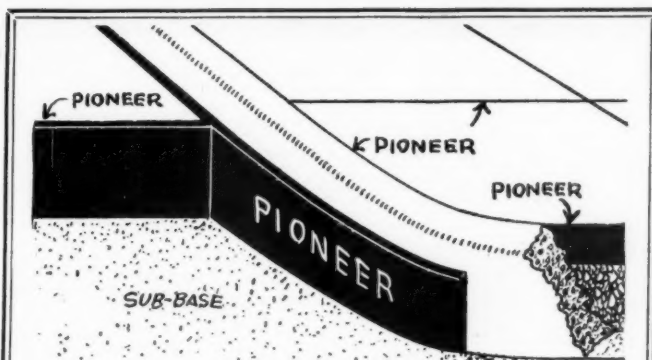
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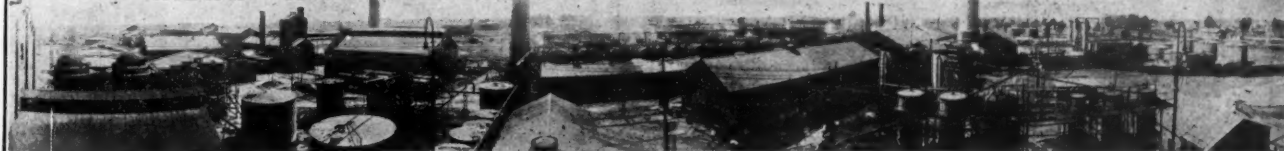
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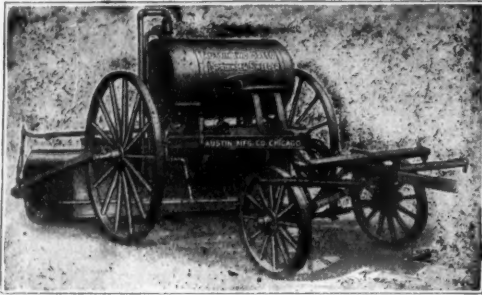
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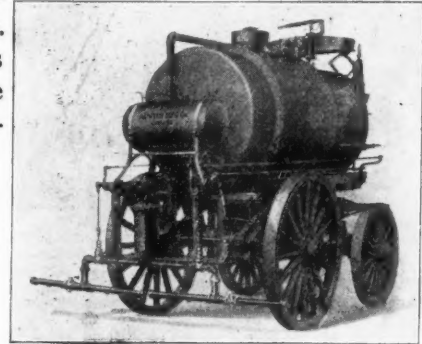
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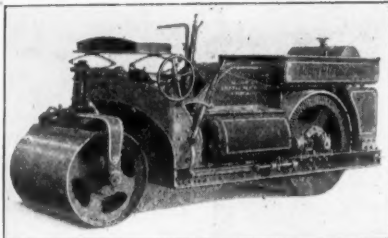
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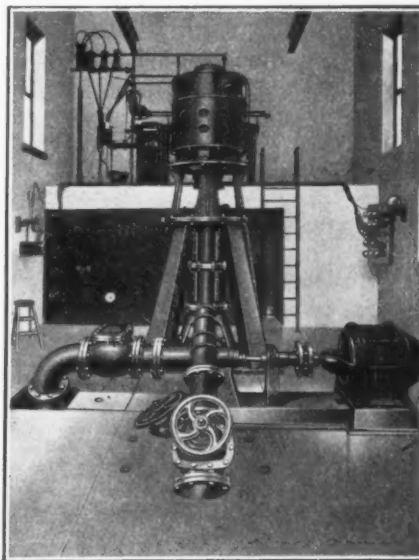
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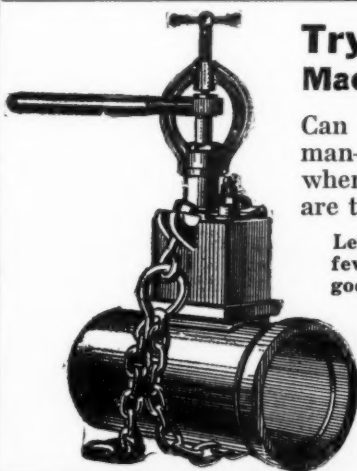
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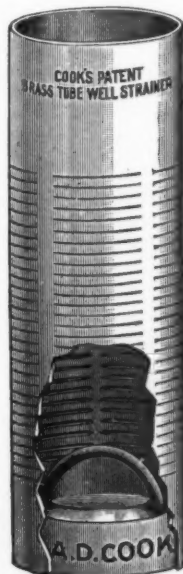
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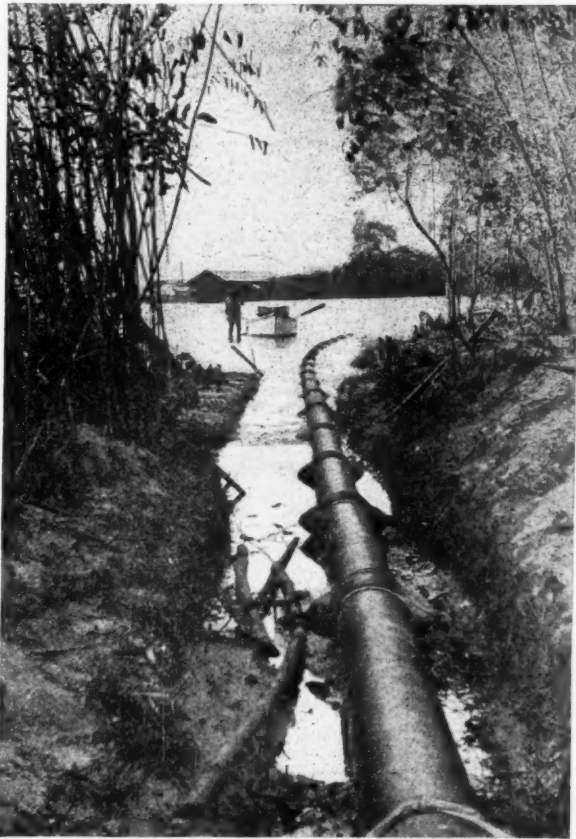
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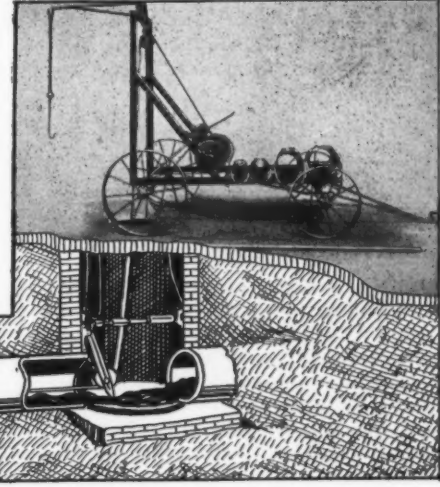
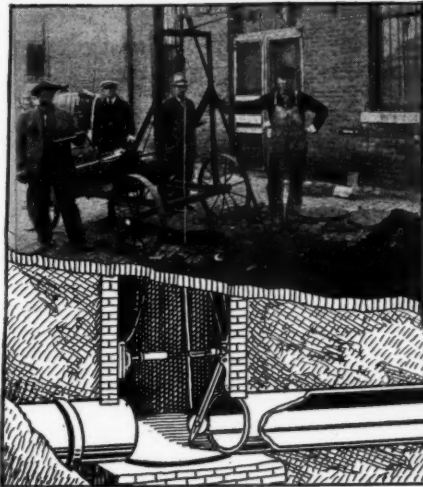
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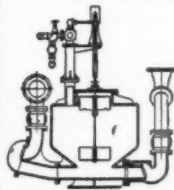
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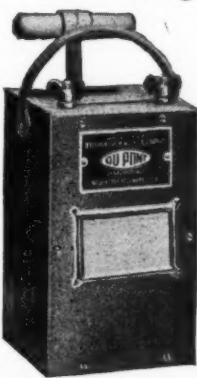
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Wood blocks cannot bulge or bleed tar if treated with Reilly's Improved Creosote Oil.

This oil gives permanent protection because it contains three times as much permanent body as the next best oil.

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Koehring Mixer Loader cuts out all wheelers in loading mixer—delivers material into loading skip from any point within 60 ft. of the mixer—measures the aggregate. Write for Catalog E-3.

Cutting Down the Paving Crew

Here is the lowest cost yardage equipment ever put on a street or highway job—the Koehring mixer loader and the Koehring paving mixer with the Koehring boom and bucket distribution of concrete. The Koehring loader precedes the mixer under its own power. Materials are shoveled into measuring bins, adjustable to any proportion of mix. Tripped on to belt conveyor moving at 500 ft. per minute, materials are delivered into loading skip or batch hopper. Cuts out all wheelers on the loading end—a light, strong, practical machine.

The Koehring paver has the heavy duty construction that prevents the yardage losses of breakdowns. It has extra liberal drum dimensions, and fast discharge. The Koehring boom and bucket system handling every consistency of concrete at power-driven speed,

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KOEHRING SIZES IN CUBIC FEET CAPACITIES

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Gasoline power, electric power or steam power.

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Wilwaukee, Wis.

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AUTOMATICALLY
STOPS FOR
NEXT LOAD

ONE MAN
EASILY
OPERATES
MIXER

BOOM
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ON ARC
OF 180°

BUCKET
STOPS AT
ANY POINT
ON BOOM

BUCKET
AUTOMATICALLY
CLOSES WHEN
STARTED ON
RETURN

NO
SPILL
IN FILLING
BUCKET NO
MATTER WHAT
THE POSITION
OF BOOM

